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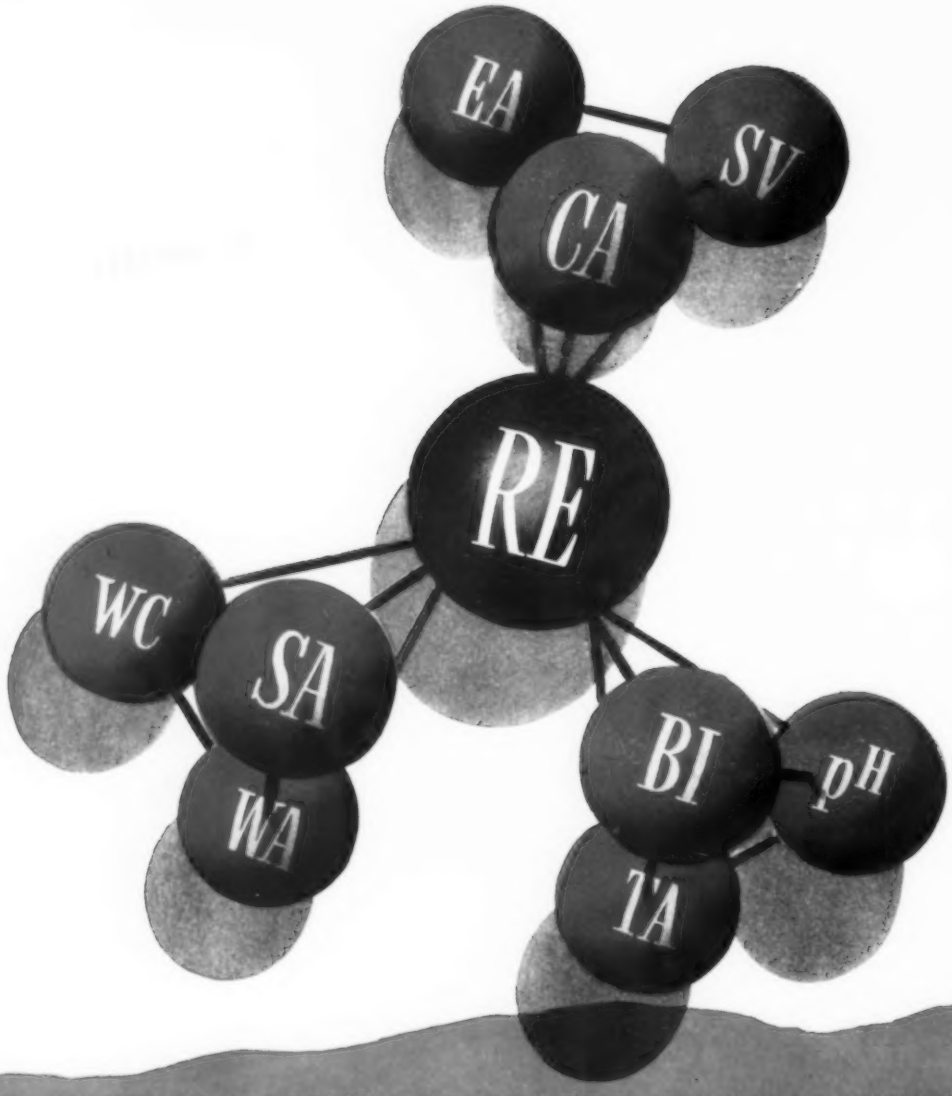

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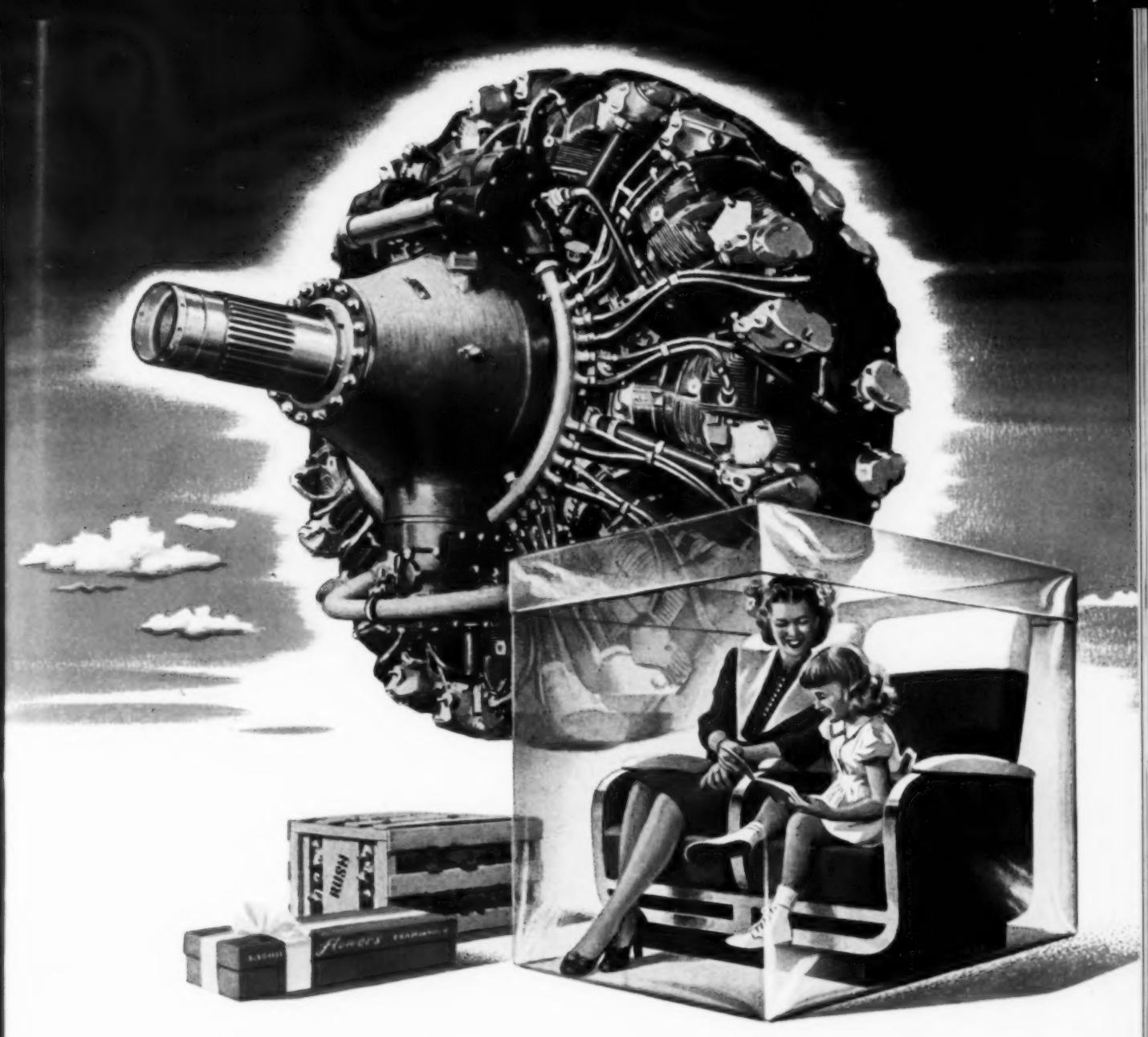

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DECEMBER, 1944 VOL. XXII, NO. 6

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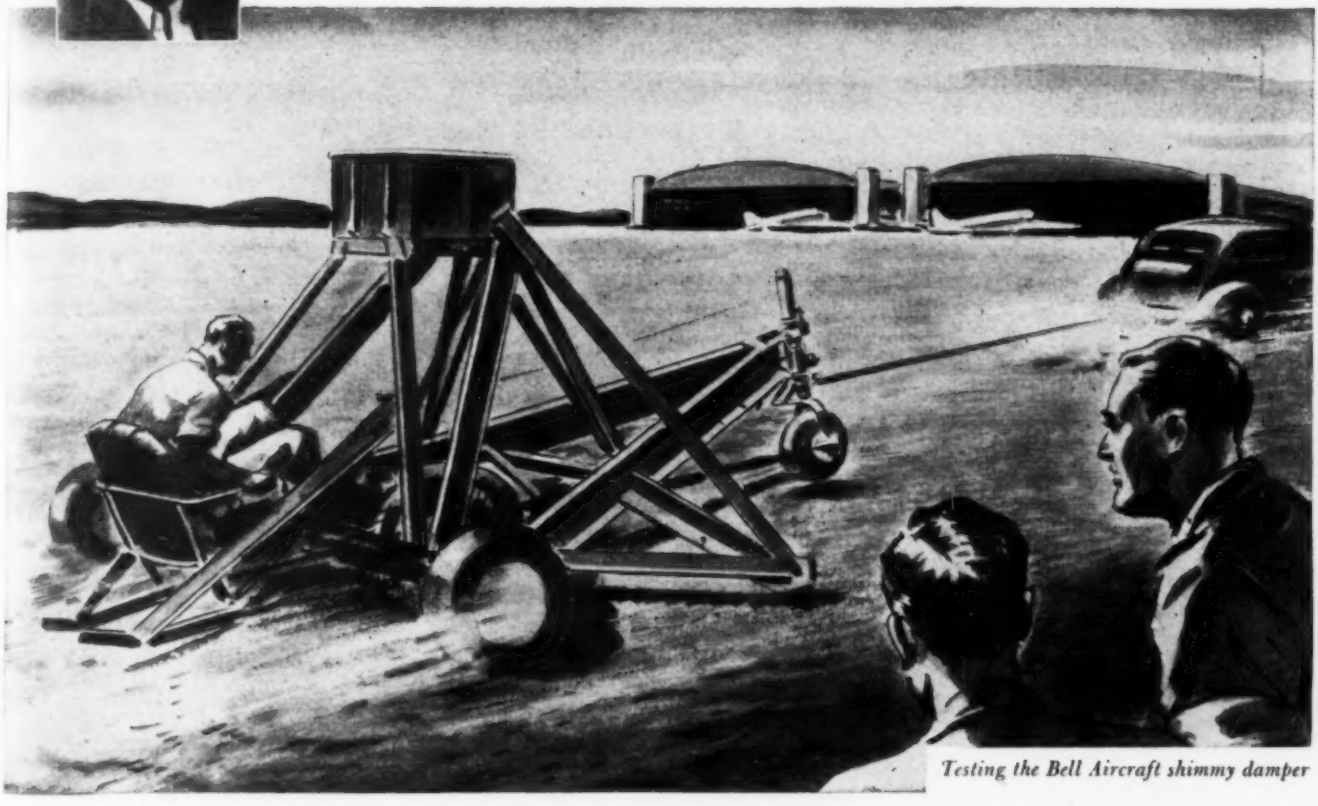
DESIGN FOR SAFER LANDINGS

BY FRANK A. TICHENOR

Publisher of Aero Digest explains the action of the Bell-designed shimmy damper now in use on many U. S. planes employing tricycle landing gear



Testing the Bell Aircraft shimmy damper

"THE tricycle landing gear provides definite advantages—elimination of ground looping, and nose-over hazard, superior ground vision, improved ground handling and maintenance, simplified landing and take-off procedure, increased pilot safety, and easy operation from small, improvised fields.

"However, when first developed, the tendency of the nose wheel to shimmy or caster hampered its use by setting up a vibration so great that there were cases in which the nose wheel strut was literally ripped out of the fuselage.

"A former Bell Aircraft sales executive—now a Lt. Colonel in the AAF who wears the Distinguished Flying Cross—and two Bell engineers, ingeniously helped to solve this problem with the shimmy damper—a control which helps keep the nose wheel from rotating more than 60° to the left or to the right.

"Located in the bottom end of the nose wheel strut, it consists of two fixed vanes and a wing shaft on which there are two vanes. This assembly is filled with fluid.

"When the nose wheel tends to turn, the pressure of the wings forces this fluid through a metering orifice which in turn is further controlled by a thermal valve—thereby dampening the motion of the nose wheel's lateral reaction. The only outlet for the fluid is through the valve, which can be adjusted to stiffen or ease up the nose wheel action in accordance with the pilot's requirements.

"The wing shaft can rotate only in a radius of 120°, because of stops which prevent further rotation.

"War planes now land and take off in jungles and from icy steppes as smoothly as at any of our modern airports at home, thanks to this kind of pioneering.

"The shimmy damper is one of the many contributions which Bell Aircraft has made to the progress of the aircraft industry."

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JUST AMONG OURSELVES

Editorials and Comment

UNIFORM STATE AVIATION CODES

THE National Association of State Aviation Officials, meeting in annual convention last month at Oklahoma City in conjunction with the National Aviation Clinic, evolved and recommended a uniform state aeronautic department act and a uniform state airports act. The Association confidently hopes that every state will adopt the basic principles unanimously approved at the 1944 annual meeting.

At this writing, thirty states have official bodies and specific legislation dealing in aviation matters. Each of the thirty states is active in NASAO affairs. The remaining eighteen states apparently unconcerned with the state's responsibilities towards aeronautics are:

Arizona	Nevada
Arkansas	New Mexico
California	New York
Delaware	N. Carolina
Florida	N. Dakota
Indiana	Oklahoma
Kansas	Texas
Mississippi	Washington
Montana	Wisconsin

A few of these states have some type of aviation control, while others are contemplating early passage of state aviation legislation. All might well study the NASAO recommendations.

There is no longer any doubt about the direction in which state aviation legislation is heading in the majority of states. A few years ago there was much cause to fear state activities. But the trend toward establishing state barriers and duplicating Federal aviation acts has petered out, largely due to the realistic approach of the National Association of State Aviation Officials, whose members have taken an intelligent stand based on the individual state's *responsibility* to aviation rather than on the much-debated smoke-screen subject of state's rights. Only in a few of our states, where ignorance and opportunism still exist in legislative halls, is there any danger of unfriendly, restrictive action.

But the danger is real. It is threatening enough to demand the immediate attention of airmen, especially in the states listed above. Everything possible should be done in the eighteen recalcitrant states to encourage or even force liaison with or actual participation in NASAO activities to the end that enlightened state aviation legislation will be fostered and a practical amount of uniformity will be an actuality when normal aviation growth and development returns to the nation.

If we do not achieve this uniformity now—if we fail to kill once and for all the desires of certain petty state officials to over-regulate, over-tax, restrict and otherwise endanger the future of aviation—we will all pay dearly in the years to come. Worst of all, we will be guilty of a breach of trust to the hundreds of thousands of young American men in the armed services who hope to find a place in aviation when they return from war.

If you reside in one of the states listed above, it's your duty to help organize a committee of intelligent people and immediately petition your governor and your state legislature for the purpose of undertaking studies of your state's responsibilities towards aviation. Immediate liaison should be established with the NASAO, whose recommendations for uniform state aviation codes issued from the cooperation and assistance of the Council of State Governments, and representatives of the Civil Aeronautics Administration, the Civil Aeronautics Board and the Federal-State Division of the Department of Justice.

If we do not actively campaign for constructive legislation now, we are paving the way for destructive laws which will bring chaos and ruin to aviation enterprise in many states and seriously affect the national aviation economy. Since the majority of American airmen are now in practical agreement with regard to the specific duties and responsibilities of the Federal, the state and the municipal governments, the last remaining gaps can be closed. The largest and most important gap at this particular time is the few remaining states who are either dodging the issue or threatening to go off on dangerous legislative tangents and balkanize the airplane within their respective borders.

Most of the forty-eight state legislatures will convene in 1945. So now is the time to get squared away on the few remaining weak links in the aviation chain. The place to start is in our home states if we are to guarantee constructive aviation planning through intelligent legislation.

VETERAN STATUS FOR CAP?

LATE last month Senator Robert R. Reynolds (Democrat-N. C.) introduced a bill which proposes veteran status for all Civil Air Patrol members who engaged in active duty assignments during World War II. Known as S-2193, the bill is not specific enough to give a clear impression of the Senator's intentions and leaves the door wide open for considerable speculation.

We believe the Senator would recognize only those who volunteered and saw service on antisubmarine patrol, border patrol, courier service, tracking and other established official missions which operated under military authority and the Articles of War. This group totals about 4,500 patrol members out of a non-active duty CAP membership of more than 100,000.

A considerable portion of the 4,500 members who experienced active duty assignments later went into the Army, Navy or Marines. We conservatively estimate this figure at about 25 per cent. Since these members will automatically become veterans of the war we can deduct a minimum of 1,125, leaving a balance of nearly 3,500 individuals.

A large number of this remainder were "part-time" volunteers, some of whom reported for duty spasmodically or for brief periods of time and continued on with their trades or professions. In our opinion this group, which runs around 40 per cent or 1,400 people, neither expect nor deserve veteran status. Consequently, Senator Reynold's bill will affect about 2,000 CAP members.

Of this number there can be no doubt but that the widows, children or dependents of Civil Air Patrol members killed on active duty assignments should come under the pension laws even if it takes a special Act of Congress. Those CAP members who gave their lives are just as dead as those who die on foreign battlefields. They

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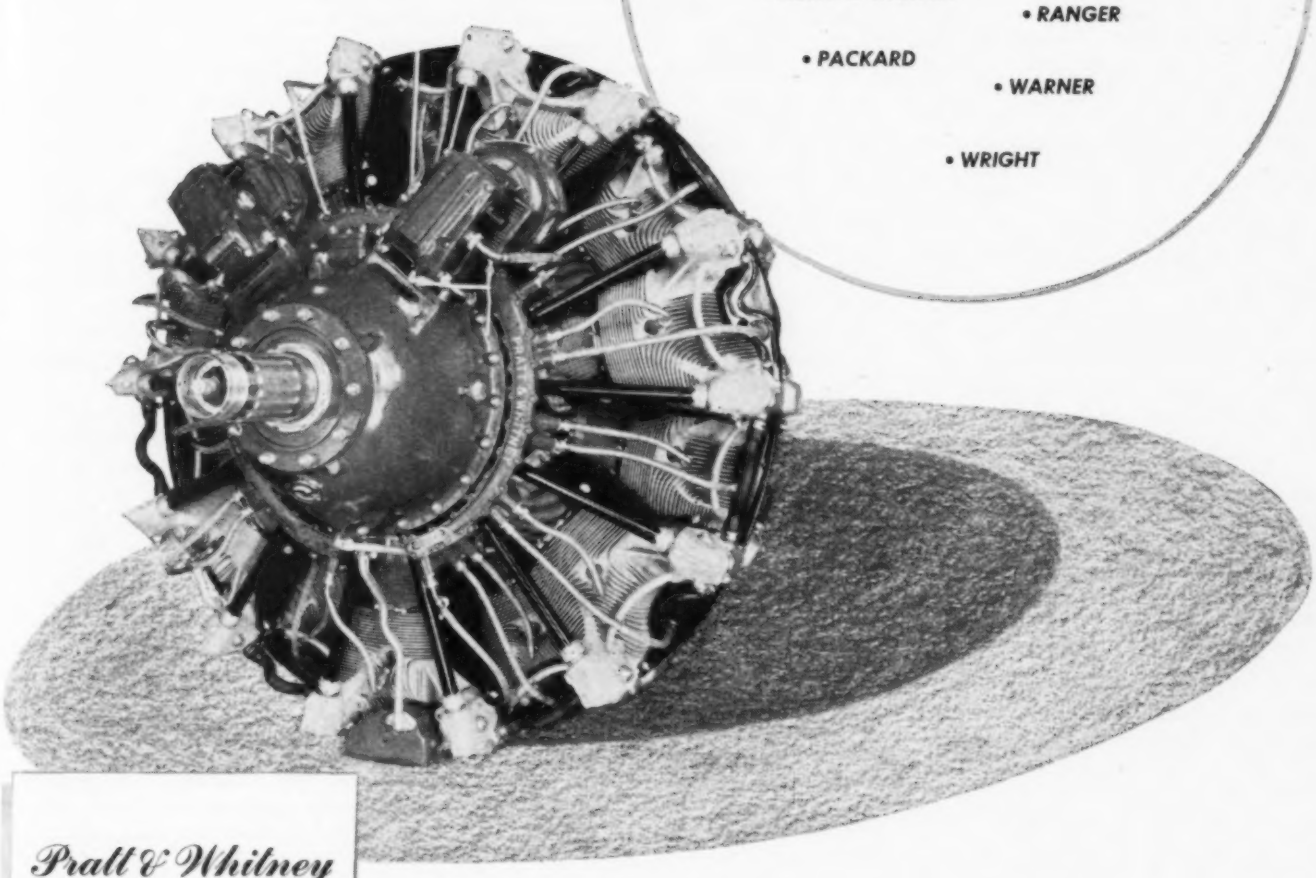

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SCINTILLA MAGNETO

DIVISION OF **Bendix** AVIATION CORPORATION
SIDNEY, N. Y.

wore the uniform of their country, they were on military assignments, including actual combat missions, and were under the Articles of War.

S-2193, however, recognizes all active-duty CAP members as veterans of this war in the administration of pension laws or any laws conferring rights, privileges or benefits upon such persons honorably discharged from the armed forces as well as upon their widows, children or dependents. This blanket provision covering everybody, whether they signed up for thirty days or for the duration, will give rise to considerable argument. Consequently, clarification appears necessary. Will the thirty-day volunteers who flew an occasional courier trip be placed in the same category with men who flew hundreds of hours for as long as two years over coastal waters in single-engine land planes carrying bombs?

From where we sit it appears the well-intentioned backers of Senator Reynolds' bill will have to clarify this point, find a practical formula to determine what members deserve veteran status and rewrite the proposed legislation in a more realistic manner if it's to meet with any measure of success. Most of the CAP members who signed up "for the duration" and gave long and arduous months to active duty missions at great personal sacrifice did not do so in hopes of Federal patronage or any future security. Many of them would like to be known as veterans of this war, but few, if any, actually desire any of the monetary emoluments that go with veteran status.

We confidently hope that a realistic solution to the problem can be worked out and the legal technicalities overcome so that justice will be done, first, to the dependents of those killed in action and second, that the designation as World War II Veterans be applied to the two thousand "duration" patrol members who went off to fight the war just as patriotically and realistically as ten million G. I. Joes.

Finally, an expression from the Secretary of War is needed to indicate the official attitude of the armed forces in this matter. So far as we know, nothing official has been released, although it is commonly known that the services classify persons engaged in the war effort either as "civilians" or as "members of the armed forces." In the limbo between the two classifications lie the roots for many misunderstandings. It is here that official expressions are needed in behalf of Civil Air Patrol active duty members. The War Department undoubtedly will be called upon by Congress to express itself, now that Senator Reynolds' measure has been introduced.

THE FEEDER LINE FARCE

PRACTICALLY everybody and their cousins are petitioning the Civil Aeronautics Board for certificates of convenience and necessity to operate short-haul "feeder" or "area" airlines in every section of the nation. The petitioners hire legal and technical counsel, compile elaborate statistics and submit fantastic exhibits in a vigorous attempt to prove the crying need for air service over the proposed routes, and that they are ready, willing and able to operate.

We have ceased trying to keep up with the number of applicants, but the total now runs into hundreds. The temperature has reached a new high what with CAB officials conducting hearings in several centers of trade areas. Everyone will be heard, which is good old Democracy at work, but let's avoid the inference to the public that every Podunk Center in the nation will soon be a scheduled stop on A & P Airways. A large number of our small town citizenry actually believe that within a few months their beloved Beanville will have scheduled air service. It won't be too healthy for aviation when the toy balloon bursts and the cold, hard rules of economics go into action.

That this nation must eventually provide air service to all the people is an acknowledged fact. That the sound expansion of present domestic airlines and the early establishment of secondary routes serving communities capable of supporting air transportation with a steady flow of passenger, mail and express traffic, is a vital necessity. But scores of applicants for feeder line certificates have literally gone off the deep end by including every "burg" and hamlet as a stop. It's quite easy to take out a map and draw a paper and pencil airline. But such an impractical pastime will only lead to disappointment and disillusionment.

A few months ago the CAB awarded a temporary or experimental certificate to Essair, a Texas company soon to begin operations between Amarillo and Houston via several substantial intermediate towns. Ostensibly, Essair would be a feeder line guinea pig from which valuable operating experience might be gained for the purpose of establishing a *modus operandi* for feeder line policy. Although an adequate definition of the term "feeder line" is still lacking, we can't find anyone who agrees with the CAB that Essair is in the category. Rather, it is a conventional airline from the standpoint of length of route, type of equipment, size of cities served and all other major considerations. Instead of Essair doing all the "feeding", the major airlines, whose routes are crossed by the newcomer, will send a flow of passengers, mail and express into the towns on Essair's route—growing, active towns that have long needed air service.

If America at one time desperately needed a good five-cent cigar, what she now needs is more common sense in the big push to expand domestic air transportation. While there are numerous opportunities for air mail pick-up services similar to the commendable All-American Aviation operation in the East, it is ridiculous to presume that hamlets every eighteen or thirty miles could provide passenger traffic in the quantity required for business-like operations. We must face these facts: First, adequate flying equipment simply isn't available; second the airport program and the Federal airways expansion program are still stymied; third, costly and sustained subsidy is out of the question; fourth, even if moderate subsidy is to be provided by Uncle Sam, the money hasn't been appropriated.

There's a long, hard road ahead for the prospective short-haul, feeder-line operator and his financial backers. The CAB hearings now in progress will be watched with interest because out of them will come the nucleus and the pattern for postwar short-haul air transport systems.

When the CAB examiners return to Washington and all the new information can be studied, we earnestly hope the Board will establish a few simonpure experimental operations in several sections of the nation at the earliest practical moment to provide actual operating experience so necessary for finding the compass course desired. These experimental operations, based on present knowledge and reasonable expectations, would accomplish more than any other one factor in paving the way for extension of air service to more of our people. At the present time the feeder line epidemic is something of a farce which can produce a host of headaches in the years to come if we let it. It's up to the CAB to once again revise and restate its policy and clear the air of impracticable, off-center planning by well meaning people anxious to get in the air transportation business.

The CAB is doing a splendid job of allocating new routes and extensions to present routes, breaking up the log jam which couldn't be averted during the emergency. If the CAB will take the same interest in and apply similar direct action to the feeder line dilemma, a great many incipient postwar hangovers can be nipped in the bud.

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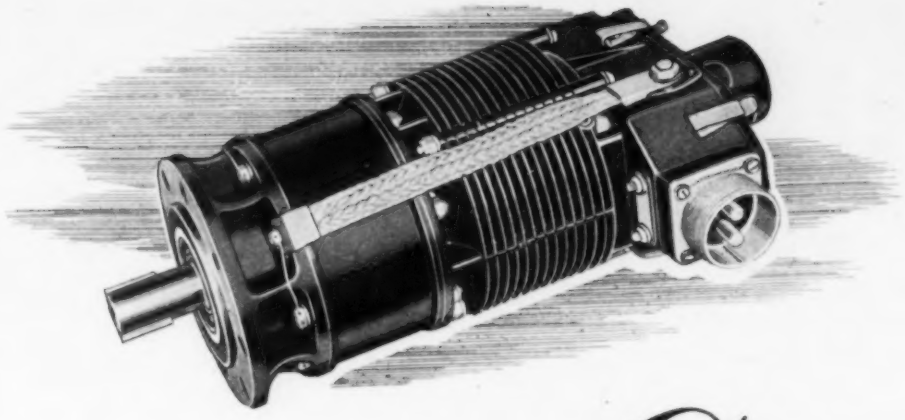

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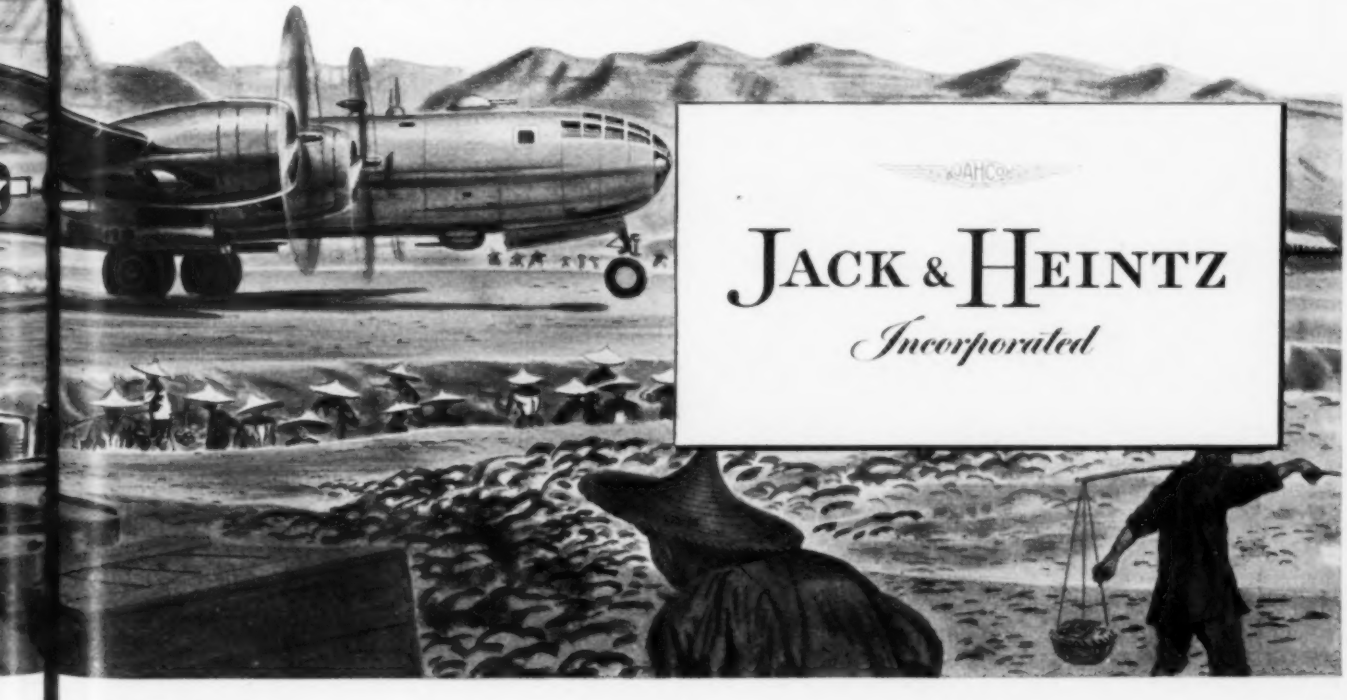

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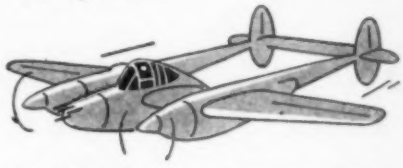

The P-38 J carries a bigger bomb-load than a "Fort"—5200 lbs.!

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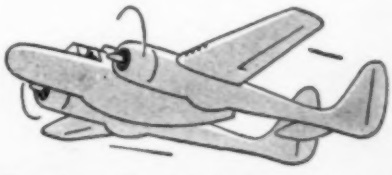
The P-47 has an in-line engine. Does *too!* The 47 was originally given an in-line—the P-47 B was the first to have a radial!

from PVT. EUGENE M. PRZYBYLA, Perch Pilot (br), A. S. N. 16081134, 44-40 H. A. A. F. Bks. #203, Harlingen, Texas.



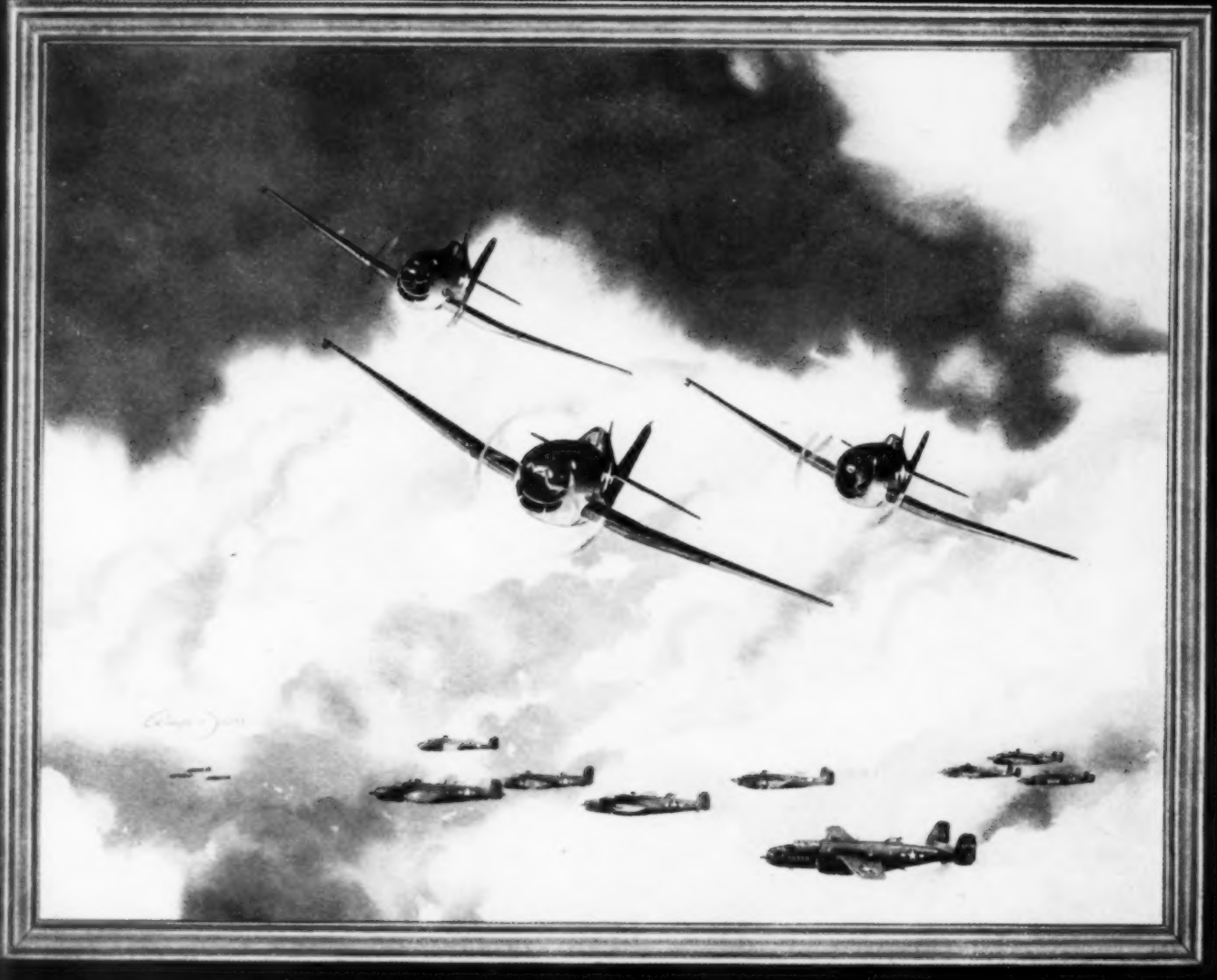
Plans have already been made to convert the P-61 into a postwar, cargo-passenger job with a new fuselage.

from KARL VOLLMER, Perch Pilot (br) 228 East 71st Street, New York City.

Gulf Oil Corporation and Gulf Refining Company...makers of

GULF **GULF AVIATION PRODUCTS**

OIL IS AMMUNITION—USE IT WISELY



U. S. Navy's Grumman Hellcats—Escorts of the Sky

Grumman

AIRCRAFT ENGINEERING CORPORATION, Bethpage, L. I., N. Y.

THAT OUR AIRCRAFT MIGHT *Master* THE ELEMENTS

WHAT'S THE PROBLEM? *700 mile speeds? 70° below zero cold? 50,000 foot altitudes?*

A huge wind tunnel to test large models at speeds exceeding 700 mph! A high altitude chamber that duplicates the pressure and paralyzing cold of the stratosphere! A torture chamber where hydraulic tension jacks twist, wrack and punish an airplane more severely than flying conditions ever could!

With these and many other instruments of aeronautical science "worth a king's ransom," Curtiss-Wright's development and experimental engineers are mutually working toward mastery of the elements. As each triumph in these laboratories reflects itself in the skies, our nation will trade and travel by air with ever-increasing safety, comfort and speed.

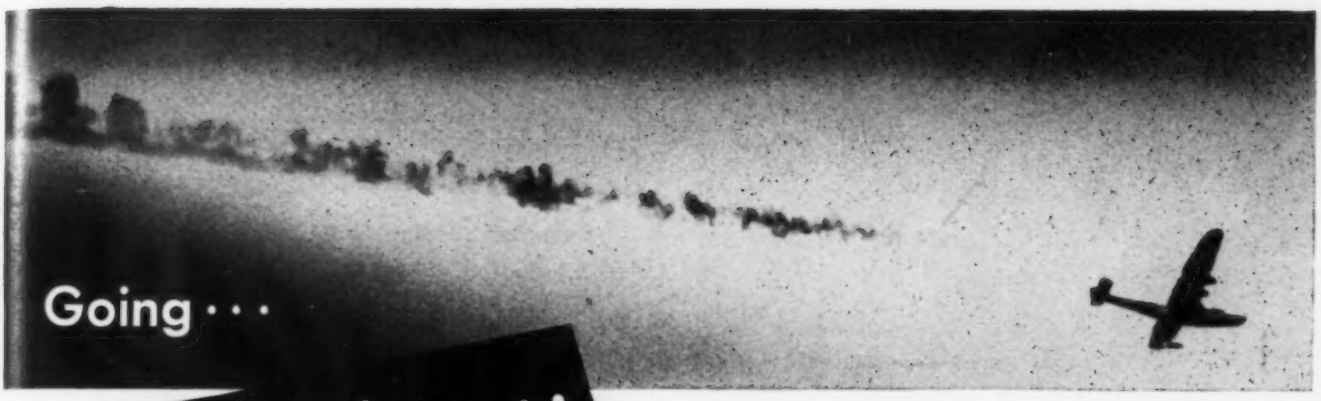
Look to the sky, America! Curtiss-Wright Corporation, Airplane Division, Buffalo, New York.

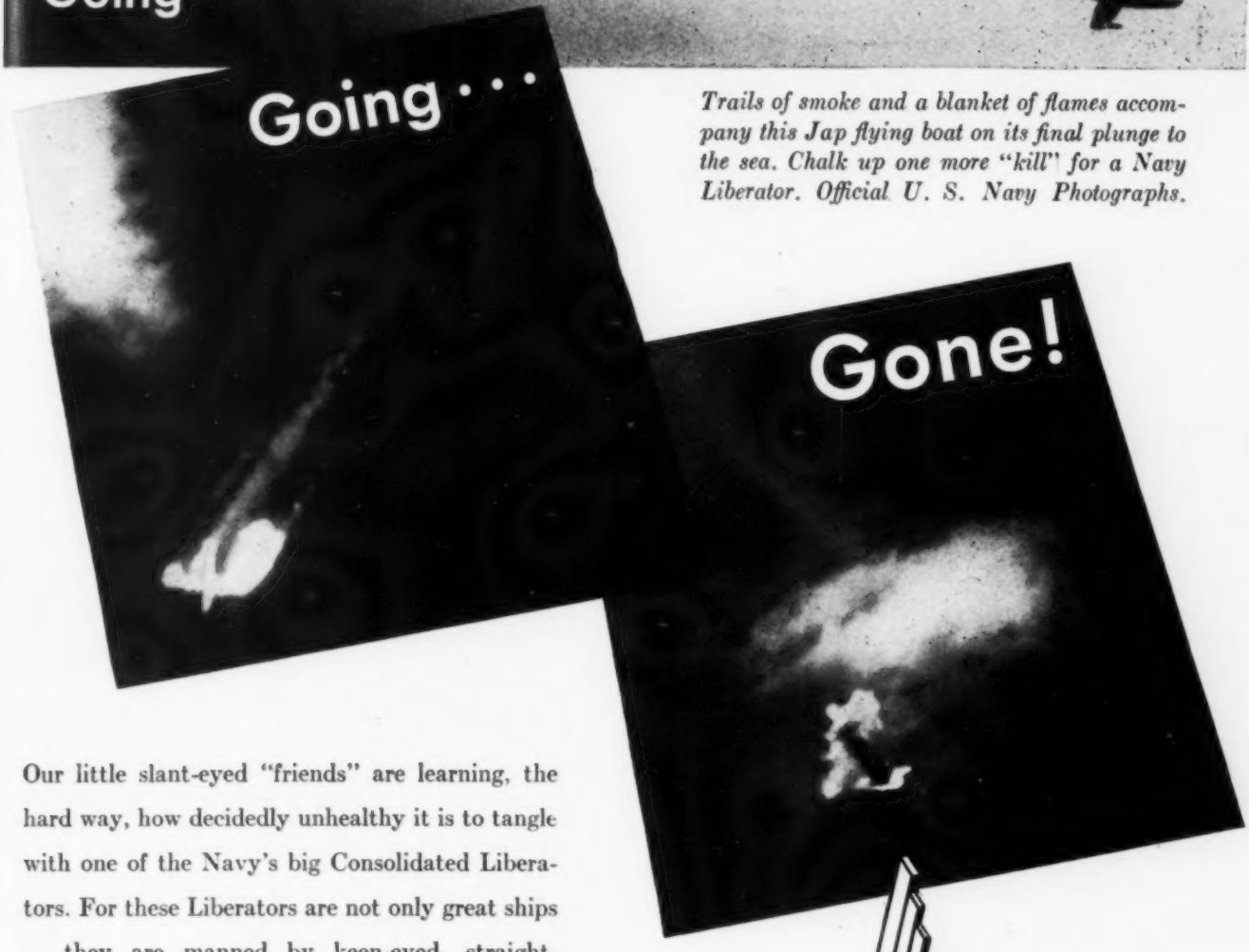
Another Contribution of

Curtiss-Wright

to the Advancement of Aviation

Member Aircraft War Production Council East Coast, Inc.





Trails of smoke and a blanket of flames accompany this Jap flying boat on its final plunge to the sea. Chalk up one more "kill" for a Navy Liberator. Official U. S. Navy Photographs.

Our little slant-eyed "friends" are learning, the hard way, how decidedly unhealthy it is to tangle with one of the Navy's big Consolidated Liberators. For these Liberators are not only great ships . . . they are manned by keen-eyed, straight-shooting, "hell-for-leather" American boys who like nothing better than to get a Nip flying boat, such as the one pictured here, in their sights.

It is gratifying to us here at CECO to know that CECO carburetors and fuel pumps on these newest great Liberators are doing their part in helping our fighting men beat a path to Tokyo. And we pray that the day is not too far distant when once again CECO products will be earmarked for airships rolling off peacetime assembly lines.

CECO

CARBURETORS

FUEL PUMPS

PROTEK-PLUGS

CHANDLER-EVANS CORPORATION SOUTH MERIDEN CONNECTICUT, U. S. A.

IRVIN AirChute

"SINGLE-RELEASE" Harness

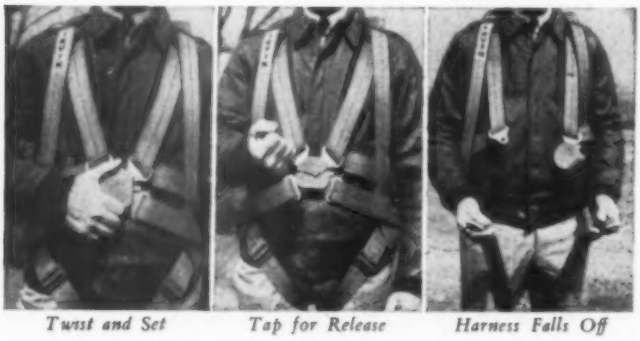
UNITED NATIONS' FLYERS

are using it for

SAFER LANDINGS

A one-hand turn and a tap on the single frontal disk instantly releases the harness . . . leaving the flyer entirely free. Accidental release is impossible before disk is "set" for action.

All United Nations' Air Forces for years have used IRVIN as standard equipment . . . and now the Irvin "Single-Release" harness is acknowledged as superior for all landings. IRVIN, as always, leads in Safety.



Twist and Set *Tap for Release* *Harness Falls Off*

IRVING AIR CHUTE CO., Inc.

Main Office: 1670 Jefferson Ave., Buffalo 8, N. Y.

Complete Factories in Buffalo, N. Y., Glendale, Calif. (1500 Flower St.), and Lexington, Ky., U. S. A. . . . Canada, England and Sweden . . . All Serving the United Nations' Air Forces.

BUY MORE WAR BONDS

AIR REPORT

SIGNIFICANT TRENDS IN THE NEWS

Castered Landing Gear Development Halted

Through an ironic twist of governmental ineptitude, further development by the CAA of the castered, or swivel, landing gear has been brought to an abrupt halt. The fact is that the Budget Bureau struck the item from the list of proposals submitted by Administrator Theodore P. Wright.

The irony in the case is that the Budget Bureau went happily along with the idea of spending more than a billion dollars on airport installations yet failed to see the need of spending a few thousands to discover whether the castered gear is the answer to close-in airports and two-way landing strips. Thus the first non-evolutionary idea to be projected into aircraft design in years dies a-borning.

On being interviewed, John H. Geisse, chief of CAA technical research refused to comment on the action. Nor would he say whether or not it was this latest example of frustrated exploration that led to his announced resignation. Mr. Geisse was smilingly noncommital beyond saying that he planned to tender his resignation as soon as the Administrator returned to Washington.

★ ★ ★

"T" Hangars Obsolescent?

Some airport observers believe that it's a poor investment to build conventional "T" hangars now because (1) many postwar lightplane designs incorporate tricycle landing gear (which increases height of tail) and (2) twin tail booms are a certainty. Watch our "Modern Airports" section for sound advice on postwar requirements for individual hangars. The subject will be thoroughly covered early in 1945.

★ ★ ★

Six-Mile Airport Separation

The unwritten but widely applied law requiring a six-mile separation between airports by the interdepartmental air traffic control board is going out the window. A careful study of recent designations of landing areas reveals relaxation of the requirement. Sentiment is growing throughout the industry that airports should be permitted to grow naturally with a minimum amount of restriction. However, a large amount of disagreement on the subject still prevails and will necessitate conference, study and action in the near future.

William P. MacCracken, Jr., chairman of the NAA Joint Airport Users Conference, has started the ball rolling with the creation of a special technical sub-committee on air traffic control problems to study the separation distance between airports. Work of the panel will involve study of takeoff, landing and performance characteristics of postwar commercial and private aircraft and probably postwar traffic volume.

★ ★ ★

Short Haul Figures Revealing

Elsewhere in this issue is an editorial appeal for the Civil Aeronautics Board to establish experimental short haul airlines, including additional air mail pick-up services, in several typical trade areas lacking air service and presumably capable of supporting some kind of scheduled operation. Such experiments would reveal information not now available and assist materially in formulating sensible policy for expansion of domestic air services.

Meanwhile, one Albert L. Zimmerly, who operated an

Supplies —PAC stocks of parts and accessories are large—include national accessory and supply lines.

Aircraft —For years we have used production methods in reconditioning aircraft—have adopted new techniques during the war.

Propeller —PAC has the largest and finest facilities for overhauling, testing, and balancing propeller mechanisms for all commercial and private planes.

Engines —Production line operation enables us to expertly and economically recondition engines of all types and sizes.

--for Your Protection

Pacific Airmotive service and supplies protect your equipment and your investment—help keep down your operating costs. For years we have designed and built our own shop-tested equipment—consistently improved application of other tools. We have spent 16 years in the overhaul and maintenance of all types of planes and engines—from giant military aircraft to the smallest private ship.

Today, and in the air world just ahead, PAC will protect your plane and your pocketbook.

PACIFIC AIRMOTIVE

A PAC MAJOR LEADS THE FIELD

SUPPLIES PAC SERVICE

Division of Airplane Manufacturing and Supply Corporation

AVIATION'S LARGEST MAINTENANCE AND SUPPLY COMPANY

SEE OR WRITE THE DIVISION NEAREST YOU—

BURBANK	Lockheed Air Terminal
OAKLAND	Oakland Airport
GLENDALE	6265 San Fernando Road
SAN DIEGO	544 7th Avenue
KANSAS CITY	1628 McGee St.
SEATTLE	P.O. Box 272, Kent, Wash.

intrastate airline in Idaho with single-engine Cessna "Airmasters" during June, July, August and September, provides some interesting operating figures. Flying day-contact only, he carried 2,237 passengers for a total of 511,790 passenger miles. Total operating revenue was $27,816 as against expenses of $29,025. This made for a loss of $1,209 for the four-month period. Fares averaged 7 cents per mile. Average load factor in September was 72 per cent.

Zimmerly has forty people on his payroll, including eleven pilots and ten mechanics. A veteran fixed-base operator, he established the temporary scheduled intrastate airline as an experiment. His operational figures are interesting because (1) he used single-engine equipment, (2) he operated in a sparsely populated area, and (3) a small mail subsidy would have made the difference between loss and profit.

★ ★ ★

Lockheed Searching for Lightplane Design

Look to Lockheed for revolutionary new ideas in small planes, but don't be too sure their first attempt will be placed on the market. Desert flight tests have been conducted with a single-place monoplane possessing startling innovations from engineering to price, which would be in the neighborhood of $750-$1,000. Powered by a fifty-hp. aircooled engine, it has a 450-mile range, a top speed of ninety mph., "descends at half the speed of a parachute with stick full back," and lands or takes off within 500 feet. While some have taken this to mean Lockheed is entering the putt-putt business, fact is that capable Bob Gross and his engineers are not yet decided. They are searching out new engineering possibilities for a foundation from which full-scale lightplane manufacture and sales might be developed. Inside dope is that more Lockheed designs in the putt-putt class can be expected.

★ ★ ★

St. Louis to Make Headlines

As we went to press the NATA-ADMA conventions were preparing to open in St. Louis with Convention Manager C. R. Mooney priming the works for newsbreaks on postwar developments in private aviation. Several new airplanes were to be unveiled and company spokesmen were to bare other recent developments.

★ ★ ★

Speed Across the Pacific

One of SOUTHERN FLIGHT's contributing cartoonists, an NATS copilot, was transferred recently to the Honolulu-San Francisco cargo run, and postmarks on his letters emphasize a recent speed-up in Pacific transport flying. One letter postmarked on the 27th of the month in Hawaii reached Dallas the night of the 29th. Douglas four-engine Skymasters, carrying 8,000 pounds of cargo, average only twelve hours between Pearl Harbor and California.

★ ★ ★

Jets Reducing Maintenance Problems

Squadrons using Uncle Sam's jet-propelled fighters find their maintenance troubles incredibly few in comparison with units using ordinary fighters. Fewer maintenance personnel are being assigned to jet units. What troubles are being encountered deal mostly with the turbo, which turns at extremely high speeds and must withstand extremes in heat and gases.

★ ★ ★

"Talking Speed" Going Up

Secrecy surrounding U. S. fighter speeds has been relaxed slightly to allow North American to announce the P-51 Mustang's level flight performance as being 45[illegible] mph. That is 25 mph. above the previous rating but still considerably below the fighter's top. NAA tags its prize as being "the world's fastest propeller-driven airplane."

★ ★ ★

Reversible Props Shorten Runway Length

A certain "heavy ship," as the AAF described it, recently ended its landing roll within 900 feet instead of the 1,500 feet normally required and the 6,000 feet necessary without wheel brakes or flaps. The pilot used reversible-pitch propellers, cutting his power momentarily, reversing the blade pitch and then gunning the engines to shove the air as a means of braking. Reporting additional experiment and need of refinements, the Air Technical Service Command comments: "Reversible-pitch propellers may be used in conjunction with take-off rockets, enabling giant airliners of the future to operate on regular schedule at airports which now are of hardly adequate size for emergencies." The combination may well repaint the postwar feeder line airport picture.

★ ★ ★

Postwar Vignette

The Rumor Department reveals another well-known prewar personal aircraft manufacturer has produced and is flying a tricycle, twin-tail, pusher-type airplane. Power is 185 hp. which provides a cruising speed of around 130 mph. The tear-drop cabin seats four people and is luxuriously upholstered and appointed. The ship operates conventional three-control system on the ground (taxiing, taking off and landing) and becomes two-control in the air. Estimated sales price: $4,500. Estimated cost for major on engine: $165.

★ ★ ★

Navy Finds Refresher Training Valuable

The Navy's primary training school at Dallas was converted recently into a refresher and indoctrination school for AVT pilots. The only school of its kind in naval aviation, results so far are encouraging. Like the AAF, the Navy has cut its training program to the bone because of an over supply of pilots, especially instructors. At the Dallas station, AVT pilots are carefully screened, given some refresher training and in a few weeks reassigned to other operations, including combat. Although the idea of having to take refresher training makes some of the veteran pilots and instructors unhappy, results prove the value of occasional inventories and reclassification no matter how much or what kind of experience pilots have on the log book. With the pressure removed on quantity, it's logical to expect more and more emphasis on quality. Frequent checking along with greater selectivity, occasional refresher training can be expected from now on out in both Army and Navy aviation programs.

★ ★ ★

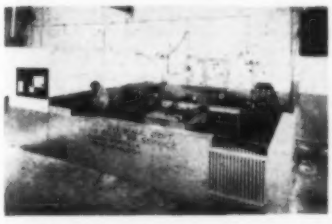
Army to Release More Airliners

Following presidential removal of the limitation on the number of aircraft which may be operated by domestic carriers, the Army Air Forces is taking steps to supply the airlines more transports "as soon as military requirements permit," thus alleviating the domestic travel problems. The carriers sold or leased to the AAF 158 of their 324 transports in 1942. Since then AAF releases have returned the carrier fleet to the 300-plane level, and although these provide more seating capacity than the original 324 transports, a critical space shortage still exists. The AAF now plans to release additional transports "in the next few months" unless the strategic situation interferes. Air travel priorities will not be affected but additional schedules will alleviate the critical space shortage to some extent.

★ ★ ★

PARTS DEPARTMENT — Along with our large stocks of parts for your aircraft, engine and their accessories, we also carry a complete stock of pilot equipment including Flying Jackets, Manuals, Plotters, Maps, etc.

MACHINE SHOP — This department is equipped to take care of all your needs, from the smallest to the largest in machine work — Cylinder Grinding, Valve Seat and Valve Guide Replacement, Spark Plug Inserts or Crankshaft work.



ACCESSORY OVERHAUL — A most vital section of our Government Approved Engine Overhaul Department. The latest modern tools in the hands of men of long experience, insures proper overhaul of Carburetors, Magnetos, Starters and all accessory equipment.

INSTRUMENTS—We maintain the latest equipment to simplify the most complicated and delicate adjustments, in the hands of men of long experience—specialists in Instrument Maintenance and Repair.

RADIO SHOP — Whether it is a frequency check, trouble shooting, complete overhaul or a new radio, our factory equipped shop is ready with competent radio technicians and the best of test equipment to serve you.

Here in the Southwest this organization has brought the fixed base operator and the individual flying his own plane, a new conception of airplane service, maintenance and repair, based on the proven principles of automotive service.

The men in this organization KNOW airplanes —have been flying them . . . designing them . . . selling them—for over twenty years. Experience and equipment enabling us to do the job RIGHT the first time! From complete engine overhaul and any aircraft repair, recovering or refinishing in our government approved repair shops . . . installation of accessories . . . adjustments of instruments or radio—each service is performed by specialists, to give you MORE FLYING TIME.

Here too—you will find everything you need in Instruments and Accessories, with a complete stock of Radios and Pilot Equipment.

Sales and Service

for the Operator
MAINTENANCE
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All Kinds of Repairs FINANCED
Terms 3 to 12 Months
Major Engine Overhaul
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With the coming of peace, as in the past—we will be handling the sales of the airplanes that WILL BRING A NEW MEANING TO FLYING.

MIMAX-LAVAX
CHAMPION
Stinson
BENDIX SCINTILLA
ZYGLO MAGNA-FLUX MAGNAGLO
Hamilton Standard Propellers
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CONTINENTAL MOTORS Pumped as the Nation's AMERICA'S STANDARD
LYCOMING
Curtiss Propellers
THURSTON AIA WING FABRICS
AMERICAN BOSCH
Franklin

AIRCRAFT SALES CO.

MEACHAM FIELD FORT WORTH, TEXAS

DOCKS FOR FLYING BOATS have been designed by Glenn L. Martin, the manufacturer, for economical basing of the vessels. Four variations shown above range from elaborate harbor bases close to city terminals to small units for efficient docking in remote rivers. The special tugs, U-shaped and powered by outboard motors, would meet the boats on landing and tow them to shore facilities.

Revving Up

SERVICE PILOTS ACCOMMODATED: Military pilots still in the service and WASP's who are being inactivated got a break from the CAB last month when Civil Air Regulations were amended to provide that (1) a rated military pilot may obtain a civil pilot's certificate on a military competence basis without waiting to be released from service, and (2) a WASP, within six months following release from service, may obtain a civil pilot's certificate by displaying a military certificate showing her solo flying status as a rated pilot and the type, class and horsepower of aircraft she had been rated to pilot and if she passes the written examination on Parts 20 and 60 of CAR for the grade of certificate sought.

★ ★ ★

SCHOOLS STUDY UNIFORM SYSTEM: A special committee has been named by the Aeronautical Training Society to perfect details of a uniform system of civilian flight training and eventually making available standardized instruction at several hundred peacetime bases from coast to coast. Members of the committee are Cody Laird, president of Southeastern Air Service; Capt. Max Balfour, director of Spartan School of Aeronautics, and Maj. C. C. Moseley, president of Cal-Aero Technical Institute. They will consider means of extending to civilian instruction the benefits of rigidly supervised flight instruction as perfected by ATS contract schools in Army primary training since 1939.

★ ★ ★

SURPLUS SALES OFFICES: The Reconstruction Finance Corporation last month took over surplus plane sales formerly handled by the Civil Aeronautics Administration, with the Defense Plant Corporation, an RFC subsidiary, in charge. There has been no change in sales policy. Inquiries regarding location and description of aircraft and conditions of sale should be addressed to the nearest of the following RFC regional offices, Surplus War Property Division:

Atlanta Region—Healey Building, Atlanta 3, Ga., M. E. Everett, Manager. Georgia, Alabama, Tennessee, Florida. **Boston Region**—10 Post Office Square, Boston 9, Mass., John J. Hagerty, Manager. Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut. **Charlotte Region**—109 West Third Street, Charlotte 1, N. C., John A. Campbell, Jr., Manager. North Carolina, South Carolina. **Chicago Region**—208 S. LaSalle Street, Chicago 4, B. A. Mattingly, Manager. Iowa, Indiana, Illinois. **Cleveland Region**—Federal Reserve Bank Bldg., Cleveland 1, Ohio, J. A. Fraser, Manager. Ohio, West Virginia. **Dallas Region**—Cotton Exchange Bldg., Dallas 1, Tex-

(Continued on page 44)

CARL A. COVER

A tragic and irreparable loss to the industry occurred last month when Carl A. Cover, general manager of the Bell Aircraft Georgia Division, died in an airplane crash while landing at Wright Field, Dayton, Ohio. He was appointed to the Bell post just three months ago following a year of active duty as a Colonel in the Army Air Forces. Prior to his AAF appointment, Cover was executive vice president of the Douglas Aircraft Company.

During World War I he was a flight instructor at Brooks Field, Texas, and remained in the Air Forces until 1929 when he joined Douglas as chief test pilot. His talents for organization, sales direction and production were soon recognized and his promotions were rapid. At fifty-one, Cover was probably the most active flying executive in the industry and had logged thousands of hours in all types of aircraft. He was at the controls of his ship when it hit a high line and crashed.

In the words of Larry Bell, uttered when he announced Cover's new post at the Marietta plant, "No single individual in the aircraft industry has contributed more to commercial and military aviation than Carl Cover."

During the better part of a quarter of a century Carl Cover devoted all his energy and genius to the industry he loved and fought for—the aviation industry. His passing is mourned by thousands of men and women who worked with him and by thousands more who recognize the high place he holds on the stage of American aeronautical development.

THEY ALL *GO DOUGLAS*..

Glider troops and combat cargo all "Go Douglas". Wherever and whenever Allied strategy calls for the use of gliders they are towed by Douglas transports.

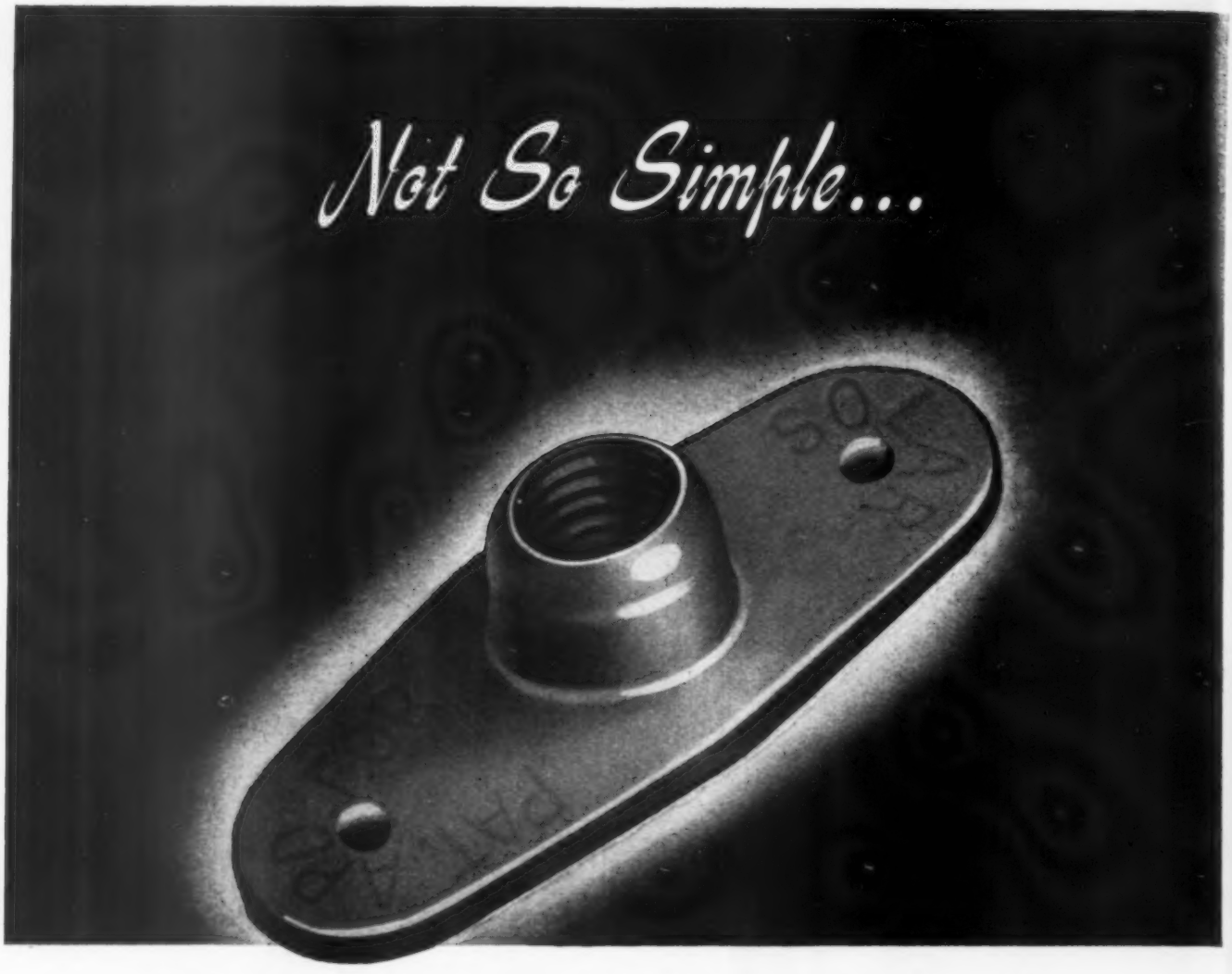
"Johnny Skytrooper" goes Douglas, too. Transporting U. S. Paratroopers into action swiftly and safely on every front is a 100% Douglas responsibility.

Airborne cargo destined for every theater of war also goes Douglas. 7 out of 10 transports flown by the Air Transport Command are Douglas C-47s, C-53s or C-54s.

First AROUND THE WORLD · *First* THE WORLD OVER

Douglas
AIRCRAFT

DOUGLAS EQUIPPED AIRLINES: American Airlines — Hawaiian Airlines Ltd. — Braniff Airways — Chicago & Southern Air Lines — Colonial Airlines — Delta Air Lines — Eastern Air Lines — Western Air Lines — Northeast Airlines — Northwest Airlines — Pan American Airways — Pennsylvania-Central Airlines — TWA — United Air Lines — China National Airways — Pan American-Grace Airways — Avianca (Aerovias Nacionales de Colombia) — Cia. Mexicana de Aviacion — Panair Do Brazil — Cia. Nacional Cubana de Aviacion, S. A. — Uraba, Medellin and Central Airways — Cruzeiro do Sul (Brazil) — Primeras Lineas Uruguayas de Navegacion Aerea, S. A. — Aerovias de Guatemala, S. A. — Canadian Pacific Airlines — Australian National Airlines — Royal Dutch Airlines (K.L.M.) — Royal Netherlands Indies Airways (K.N.I.L.M.) — Sabena (Belgian Congo) — Swissair (Switzerland) — A.B. Aerotransport (Sweden) — Indian National Airways — L. A. P. E. (Spain) — Aer Lingus (Ireland) — American Airlines of Mexico — British Overseas Airways (BOAC) (England).



...To Engineer A New Product!

This little self-locking nut plate is typical of Solar's challenging spirit which, fifteen years ago, brushed aside tradition to give the world the first really safe method of venting dangerous airplane gases—the Solar stainless steel exhaust manifold.

Two years ago there was a desperate need for self-locking nut plates for military plane production which would sustain high temperatures. Solar met the emergency with SOL-A-NUT... a stainless steel nut plate developed with Solar initiative on different principles of design and construction SOL-A-NUT is simplicity itself—*now that it is finished.* But back of it are months of hard work and original thinking—of research and design—of material tests—trials in use—re-design and further tests.

It is not a simple matter to engineer new products, particularly those made of stainless steel and used where high temperatures prevail, or hot gases, acids and corrosion are encountered. This is the field in which Solar's experience and knowledge are at their best. Consult Solar on your problems. Address "Management".

ARMY E NAVY ARMY E NAVY

SOLAR

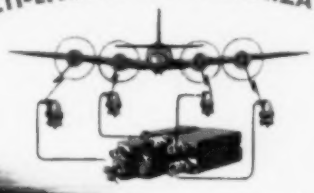
STAINLESS STEEL PRODUCTS

SOLAR

SOLAR AIRCRAFT COMPANY SAN DIEGO 12, CALIF. DES MOINES 5, IA.

VERSATILE ★ RELIABLE

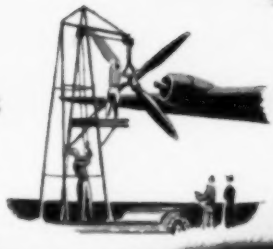
MULTI-ENGINE SYNCHRONIZATION



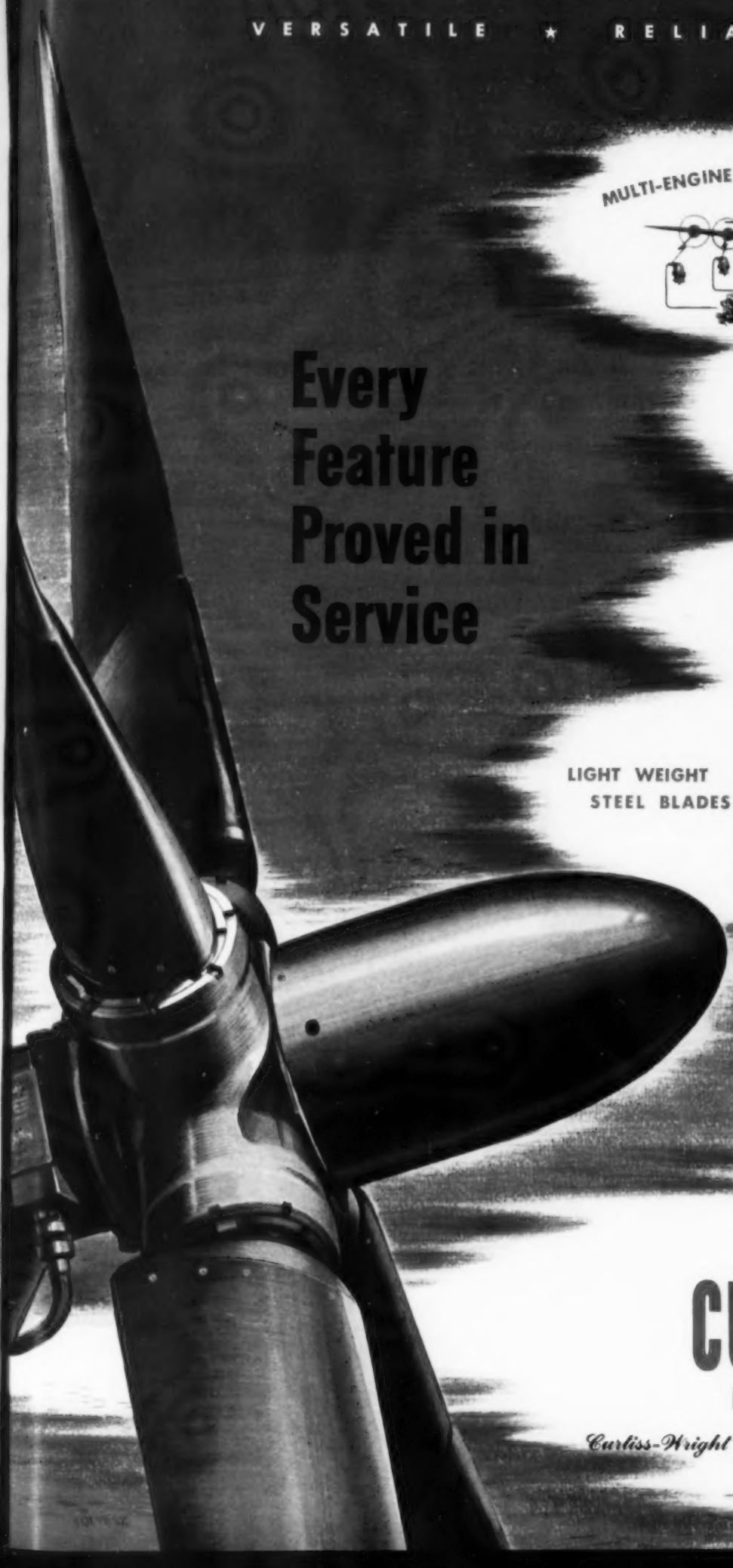
UNIT INTERCHANGEABILITY

AERODYNAMIC BRAKING

LIGHT WEIGHT
STEEL BLADES



Every Feature Proved in Service



CURTISS

ELECTRIC PROPELLERS

Curtiss-Wright Corporation, Propeller Division

Finish the Fight with War Bonds

Storm trooper—American style

As full of fight as every Boeing Flying Fortress is, there are some which have seen plenty of action, but have never fired a shot or dropped a bomb.

These are the B-17's chosen to perform vital but little-known roles out over the Atlantic during the days while Germany still held firm grip over France and Belgium.

Instead of bombs, they carried a staggering load of fuel—tons of it.

Two-thousand-mile flights were routine. They stayed out over the stormy Atlantic for fifteen hours at a time. When they returned they had priceless information.

For these Flying Fortresses were used to scout the weather.

What winds could be expected at what altitudes? What pressure areas were stirring up what air currents? What about cloud formations? The answers to these and other questions had much to do with bombing operations over Europe, and with the successful invasion of France itself . . . *because they accurately foretold the weather in the European battle sky!*

Boeing Flying Fortresses were chosen because of their exceptionally long range, and because the importance of the information required dependability such as theirs. For these famous fighting ships have the same heritage of *Boeing dependability* as the Stratoliners and Transocean Clippers, which have hung up so many performance records, and the new Boeing B-29 Superfortresses now darkening Japanese skies.

• • •

The war record of Boeing planes speaks for the vision and skill of Boeing research, design, engineering and manufacture. Tomorrow these will be turned to new and remarkable airplanes of peace for your use . . . and they are your assurance that any product "Built by Boeing" is bound to be good.

DESIGNERS OF THE NEW B-29 SUPERFORTRESS • THE FLYING FORTRESS
THE KAYDET TRAINER • THE STRATOLINER • PAN AMERICAN CLIPPERS

BOEING

Newer, more powerful Soviet bombers will be used against Japan, but this TB-6B (ANT 41) four-engine craft represents the 1941 might of the Red Air Force. Russian air bases surround Japan and Manchuria on three sides. Soon they may pound the enemy in conjunction with the U. S. B-29 offensive. —(Photo courtesy of Aerosphere.)

RUSSIAN BOMBS *for the Japanese*

When will the Soviets join the B-29 offensive against Japan? Stalin has denounced the Nips, and with Germany cornered, will settle old accounts with the Japanese when the Allies close in for the kill.

By LUCIEN ZACHAROFF

ONLY one thing may keep Russia from participation when the Allies close in for the kill in the Pacific and that is a knockout of Japan before the time set for the Soviets' entry into that war.

Last month in SOUTHERN FLIGHT I recited some of the political and economic phenomena indicating that Tokyo and Moscow are already at war, despite the frigid dragging out of the diplomatic intercourse. A few days after those lines were written, Marshal Stalin observed the twenty-seventh anniversary of the Soviet Revolution with a speech in which, for the first time since the outbreak of the war, he publicly denounced Japan as an aggressor. He referred specifically to the sneak attacks against the United States and Britain at Pearl Harbor, the Philippines, Hong Kong and Singapore.

Stalin's was a simple statement of well-known fact. Yet, the effect on the nation he leads must have been profound. Already completely indoctrinated by theory and experience in uncompromising hatred of the Axis aggressors, the Soviet people must have been primed psychologically for the ultimate step in estrangement between their country and Japan.

Emphasis On Air Power

Obviously constrained to make a reply to this plain talk, which was played up by the world press, Jap propaganda masterminds a few days later over their radio listed the western nations whom they considered aggressors, prominently including Russia. The enemy commentator added: "Is it an act of injustice to demand the ratification of an injustice forced under duress? If so, let it be remembered afresh by the world that Japan will punish an act of aggression resolutely, even staking her own existence."

Much less than those two recent pronouncements from Russia and Japan is needed nowadays to ignite the fireworks.

When the two contenders come to grips, air power will be employed on a huge scale and is apt to prove as decisive a factor as on any other global front. From the airdromes of Manchuria, Korea, and North China, swarms of obsolescent Jap craft, with a sprinkling of more modern types, will make for Vladivostok, the mighty Soviet base.

Opening the war with an aerial "surprise" attack on that and other Soviet centers, Japan will seek results comparable to Pearl Harbor in 1941. She will be gambling on catching much of the Red Air Force on the ground and on destroying it with her initial blows. Co-ordinating her air offensive with a push by land and sea, she will try to make the utmost gains while still holding the initiative.

One strategic factor will be painfully missing. For years Japan counted heavily on a double-squeeze play, with the Nazis striking on the European side of the Soviet Union. Instead, the USSR's powerful allies will be harmonizing their operations, aerial and otherwise, with the counter-offensive from Siberia.

Manchuria Vulnerable

YAK and LAGG, twin-engined and four-engined long-range bombers of Russian manufacture, the celebrated IL-2 Stormovik and other close-support aircraft will enter the lists in the defense of Vladivostok and vicinity.

For an alert air force such as the Soviet High Command has nurtured

Stalwart of Red Air Force is this large TB-7, photographed on occasion of its flight from Moscow to London and Washington carrying high Soviet statesmen earlier in the war. Among newer Russian bombers are YAK and LAGG models, about which little is publicly known. —(Photo courtesy of Aerosphere.)

in the Far East that area presents a particularly attractive air-war theatre. The Reds happen to be on the flank of the entire Jap zone of communications. Military objectives galore await the Soviet air-bombardment units.

Unhandicapped by the staggeringly immense supply lines such as have plagued the U. S. and British forces in the Pacific War, the Soviets will find their objectives within easy reach. War industries in Japan proper, the naval and commercial harbors of Korea, Dairen, the railroads of Mukden and Harbin, and, in fact, all of Manchukuo spread invitingly before the Red air arm. And is that arm itching!

The fact is that the bulk of Japanese ground forces aimed at the USSR is in Manchuria which, in the event of war, is certain to be also the location of important air bases. A glance at the map shows that Manchuria juts into the Soviet territory in such a manner that the Russians can unleash an air-and-land offensive in the form of a pincer advance, clasping the Jap forces in a vise over 600 miles long. A Tokyo military analyst declared in the magazine *Hirode* as far back as January, 1934: "The positions of the Soviet Union surround Manchuria on three sides, from the East, from the North and from the West. This is what is called position on the outer line. Such positions are favorable . . ."

Jap Defenses Inadequate

By intelligent choice of objections for their aerial assaults—and the Russians enjoy an enviable notoriety in the Axis world for their intelligent choices—the Red Air Force can grievously impair, perhaps fatally dislocate the efficient forwarding of Jap munitions, supplies, and reinforcements.

Without any wishful thinking, it may be said that the Russians will largely immobilize hostile aviation. Japan's air organization is at its best only on the offensive. Her anti-aircraft defenses are none too good; Jimmy Doolittle proved it, so did the recent B-29 incursions.

Thus, should the Russians be reasonably successful in air-bombing several scattered Japanese centers on the Asiatic mainland, it is likely that the enemy would be impelled to assign many aerial units for local defense. This necessity would result in a dispersal of air strength without providing especially adequate protection anywhere. At the same time the Japanese air forces at the fronts would be appreciably weakened.

On the other hand, the Russians—thanks to their geography and preparedness—cannot be so contained at Vladivostok. If that great base is seriously threatened, its air contingents can readily fly to prepared bases inland.

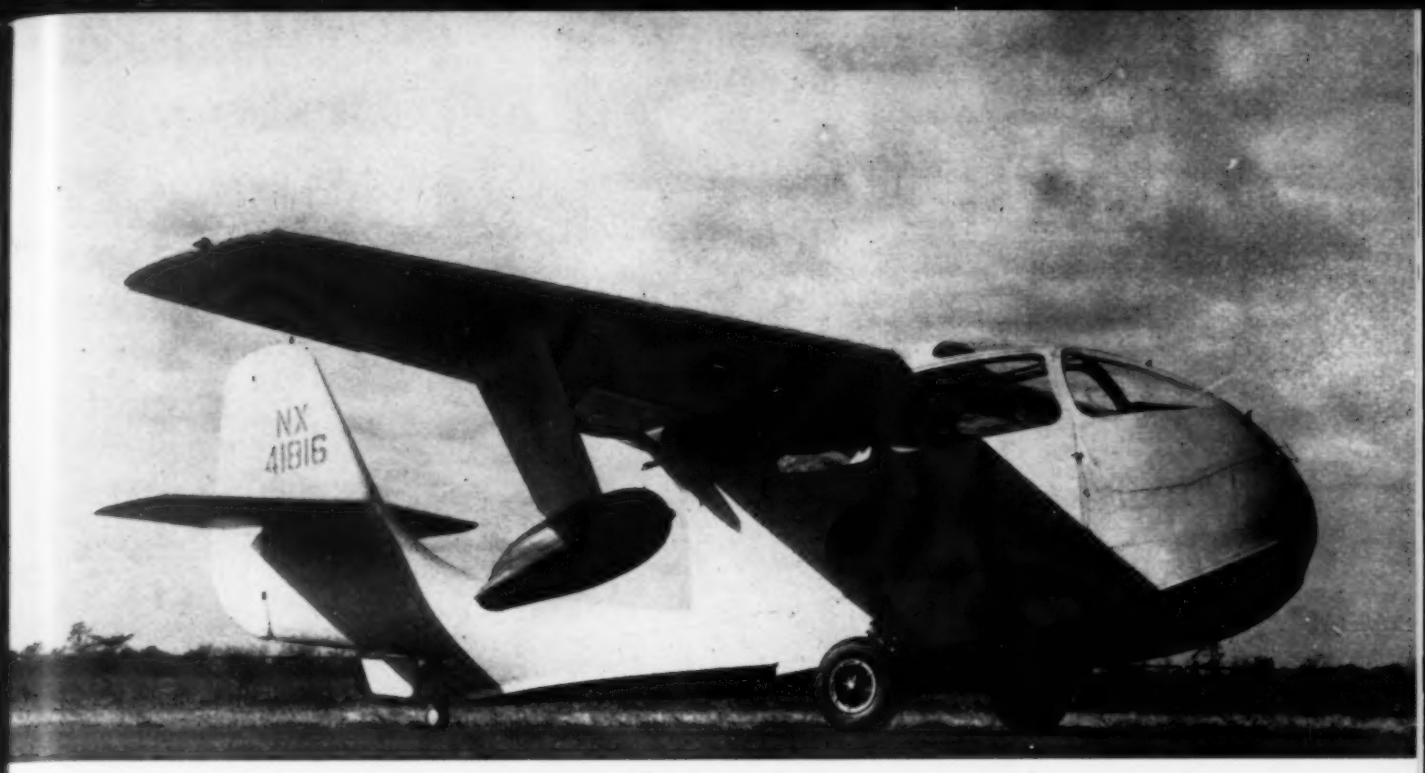
They may well shudder in Tokyo at what will happen to their sea communications and supply lines when the Red Navy's Pacific Fleet, boasting the greatest submarine aggregation of any power in the Far East, swings into action. Remember what the Soviet torpedo-toting aircraft have done to the Nazi shipping in the Baltic?

Some years ago Germany's General von Bülow uttered a friendly warning to Japan: "Although the Soviet Air Force is well over 600 miles away, it represents a greater danger to Japan than the whole United States Navy."

He was not belittling the U. S. Navy; he merely had in mind certain hard facts of Soviet aviation, geography, Far Eastern industrial potential, and other resources. And if the Japanese heed von Bülow and if they are still smarting under the rude blows received in the frontier clashes of recent years, when they probed the Soviet defenses, they will find little comfort in the old Russian proverb: Those were only the flowers, the berries will ripen a little later.

★ ★ ★

Here's another version of Russia's TB-6B four-engine bomber, equipped with older type landing gear. The wheels retract into protruding pants. Russia has been equipping its Far Eastern air units with later type planes, including many twin-engine bombers. —(Photo courtesy of Aerosphere.)



First photo of Republic's "Thunderbolt" amphibian emphasizes streamlined, full-visibility nose and clipper-type tail of the pusher-type craft. It is expected to sell for $4,000 or less.

Postwar Amphibian

REPUBLIC Aviation Corporation has entered the personal plane market with an impressive little amphibian, tentatively called "Thunderbolt" after the famous fighter craft produced in quantity during the war. Although it is still in the development stage, the prototype has been flying for some time and Republic officials planned to unveil it to the public early in December, scheduling a flight from the factory on Long Island to St. Louis.

The new amphibian is a four-place pusher, embodying exceptional streamlining and an unusually large cabin. It is powered by a six-cylinder horizontally-opposed 175-hp. engine, mounted in pusher position behind the cabin.

Preliminary specifications released by the firm promise a 105-mph. cruising speed and a price "probably under $4,000." That is one of the lowest prices yet mentioned for postwar planes in the four-place, 175-hp. class.

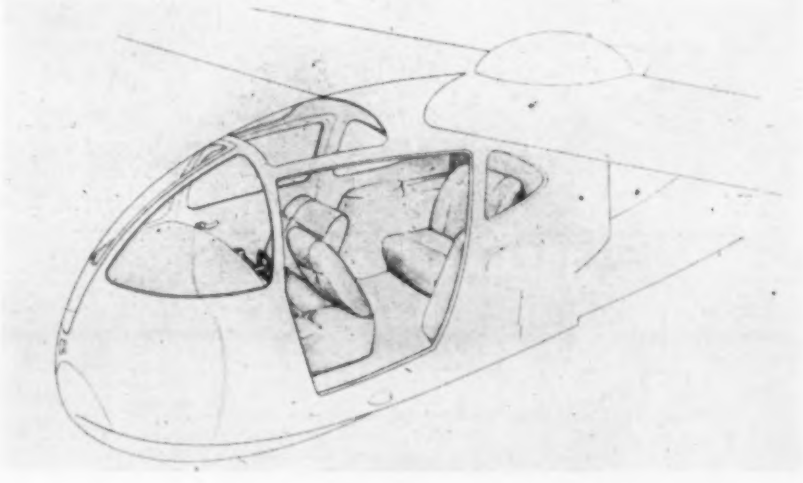
Performance of the prototype has been such, according to the company, that both Army and Navy are reported interested in the new amphibian's possibilities for sea rescue work. It is of all-metal construction, except that movable control surfaces are fabric covered. Greater safety in landing and docking, and protection of the power plant from spray were achieved in the pusher installation of the engine. It also provides unobstructed vision, for which the cabin utilizes a large amount of plexiglas.

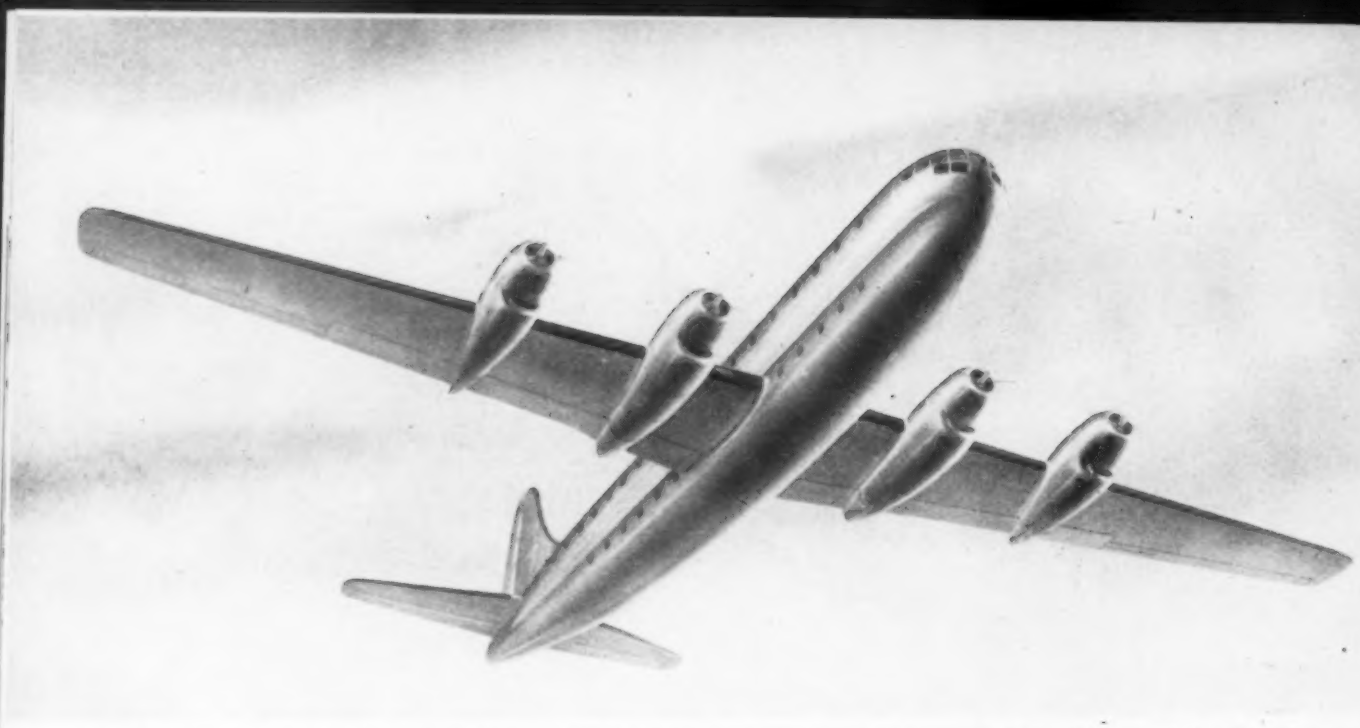
Vacuum-operated slotted flaps reduce the amphibian's landing speed to fifty mph. Its wheels are retractable, and a new design in the hull permits operation in water with only seventeen inches of draft when the craft is fully loaded. The high wing carries single-strut floats.

P. H. Spencer, credited with more experience with single engine amphibians than any other pilot, originated the design of the new Republic as the latest in a number of amphibians he designed and built during the last twenty years.

Preliminary specifications as released by Republic are as follows: Gross weight, 2,600 pounds; maximum speed, 120 mph.; cruising speed, 105 mph.; wingspan, 36 feet; length, 26 feet 6 inches; height on wheels, 8 feet 7 inches; power, in 175-hp. range; range, 5 hours; price, not determined but probably under $4,000. ★ ★ ★

Drawing shows comfort provisions in four-place cabin. Note large door, visibility and pusher installation of engine.





World's largest landplane is distinction claimed for Boeing 377, 72-to-100-passenger commercial development of the B-29. Penny-per-passenger-mile operating cost is expected of the 14,000-hp. craft. —(Boeing Drawing.)

The Boeing Stratocruiser

By WINSTON BALL, JR.

PREDICTING air travel costs "within the same price range as low-cost rail and bus travel," Boeing Aircraft Company has announced details of its Model 377, called the Stratocruiser, a pressurized, double-deck luxury transport development of the B-29 Superfortress. It has a 72- to 100-passenger capacity, a range of 3,500 miles, a cruising speed of 340 mph., and an unprecedented direct operating cost of 1 cent per passenger mile.

Tests are under way of a military prototype of the new transport, built in secrecy, making the 377 the first of the postwar super-transports to be completed by any aircraft company. All present models of the plane will be utilized for military service.

Powered by four 3,500-hp. engines of an undisclosed radial type, the plane will have a top speed of 400 mph., a cruising speed of 340 mph., and an operating range of 3,500 miles. The cabin is pressurized for flying at altitudes up to 30,000 feet with cabin atmosphere equivalent to that at 8,000 feet.

While a direct outgrowth of the B-29, having identical wings, tail surfaces and landing gear, the cabin volume of the Stratocruiser is more than twice that of the Superfortress and the fuselage is twelve feet longer. Two-deck arrangement is achieved by superimposing one fuselage on another, the top section being longer and the two streamlining into each other. The bottom section is the same diameter as the B-29, and the top section is slightly larger, with a width of more than eleven feet. The cross-section of the airplane with its two decks resembles an inverted figure eight.

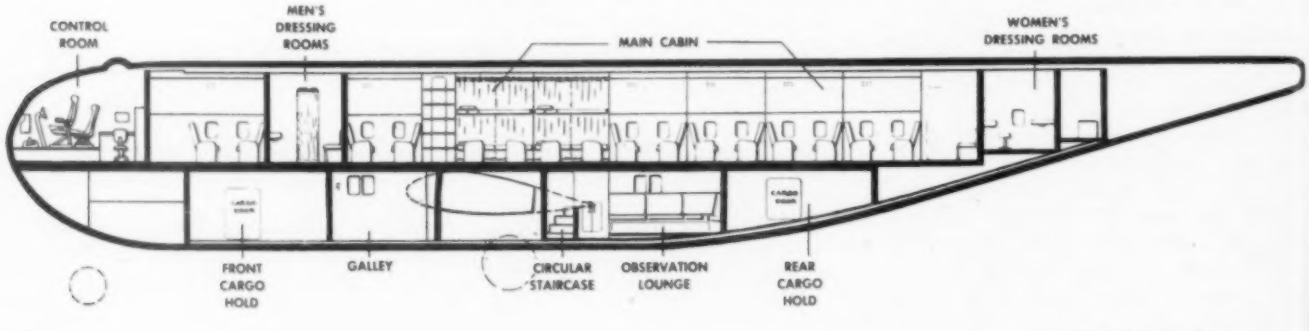
Three Versions

With the two-deck arrangement, allowing three cabins, greater flexibility in utilizing the plane to fit various operational conditions is permitted. The plane can be operated in several versions:

1.—A high-speed, low-fare transport carrying 100 passengers in all three cabins, still leaving ample space for cargo. With a readjustment of seating, this version provides 750 cubic feet of cargo space and seats for eighty-six persons.

2.—A luxury sleeper plane, having

Cross-section side view shows double deck arrangement. Bottom deck is same diameter as B-29 fuselage. Cabin volume of Model 377 is over twice that of Superfortress. —(Boeing Drawing.)



seventy-two day seats or thirty-six berths in the main cabin. The rear lower cabin is fitted as an observation, dining and cocktail lounge seating fourteen persons, and the lower forward cabin is used for cargo, galley and for crew quarters in long flights.

3.—An all-cargo plane, featured by a drive-up ramp in the rear and internal cargo-handling equipment, making loading fast and doing away with the necessity for special handling equipment. This version has a usable cargo volume of 3,000 cubic feet and a maximum cargo payload of 35,000 pounds, with direct operating costs of approximately 5 cents per ton mile.

Both day and night versions of the passenger plane are equipped with adequate galley and lavatory accommodations and the night sleeper has dressing rooms.

The new Boeing is the largest four-engine land transport yet built, having a gross weight of 130,000 pounds. The wing span is 141 feet three inches, which is the same as the B-29, but its length is 110 feet four inches, or twelve feet longer than the B-29. Aerodynamic balance of the controls eliminates the necessity for power boost, and gives the pilot the "feel" of direct control. Flight at 20,000 feet is possible on three engines.

The present tests of the military version of the plane have been announced a success by Wellwood E. Beall, Boeing vice president in charge of engineering. "It has better flying characteristics than any other airplane we have ever built, even better than the B-29 Superfortress," Beall said.

Planned for quantity production, the airplane was engineered throughout for ease and economy of construction. Ship maintenance has been made as simple as possible to keep indirect operating costs down. Fuselage construction is such that all equipment and mechanical operating devices can easily be serviced on the ground and can also be reached in flight. All four power plants are quickly interchangeable, and are designed for ease of maintenance.

Simplicity of operation was attained in building this new sky giant. An operating crew of four, plus three persons in the steward's department, is required for long ocean hops. The operating crew includes a pilot, co-pilot, flight engineer and a combination navigator and radio operator. For transcontinental service, an operating crew of three — pilot, co-pilot and combination flight engineer and radio operator—is required; two persons are in the steward's department.

Feeder lines and local service aircraft are among the types of indicated postwar planes that Boeing is working on, while building the Stratocruiser.

Specifications

The Boeing Model 377 is a four-engine, low-wing, two-deck, pressurized cabin passenger transport.

Wing spread—141′ 3″

Length—110′ 4″

Height—33′ 3″

Weight, empty—70,000 pounds

Weight, gross—130,000 pounds

Weight, landing—105,000 pounds

Power—4 engines of 3,500 horsepower each at takeoff

Maximum speed—400 miles an hour

Cruising speed—340 miles an hour

Operating range—3,500 miles

Operating ceiling—30,000 feet

Passenger capacity—Special day version: 100 passengers. Luxury sleeper: 72 day passengers, 36 berths, plus 14 lounge seats

Cargo capacity—Passenger version: 750 cubic feet. All-cargo version: 3,000 cubic feet usable space; 35,000 pounds

Propellers—4-blade, 16′ 7″ in diameter

Landing gear—Tricycle gear with dual wheels throughout

Wing—Boeing "117" (Same as Boeing B-29)

Tail surfaces—Same as Boeing B-29 Superfortress

Fuselage—Maximum cross-section: Height, 15′ 9½″; Width, 11′

Main Passenger cabin—Length, 60′

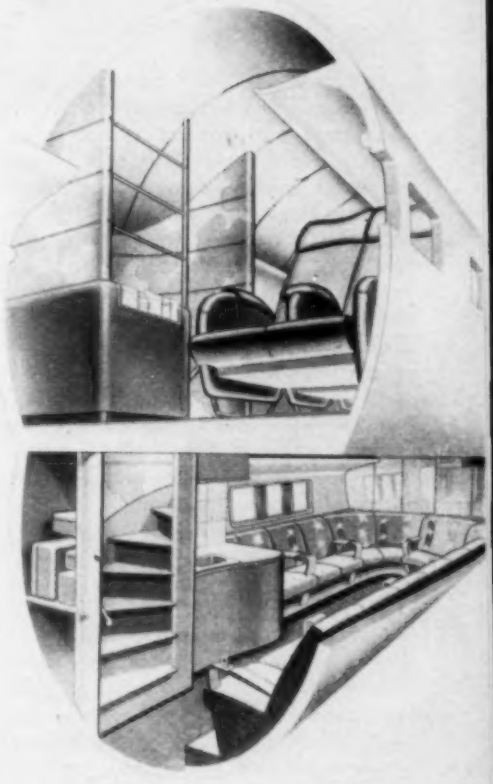
Cabin—Completely supercharged except for tail storage area. (When flying between 8,000 and 30,000 feet, atmospheric conditions in the cabin are maintained at an 8,000 foot basis.)

Furnishings—Upholstered seats for day passengers. Each seat equipped with individual reading light, ash tray and push-call button. Roomy berths for night sleepers.

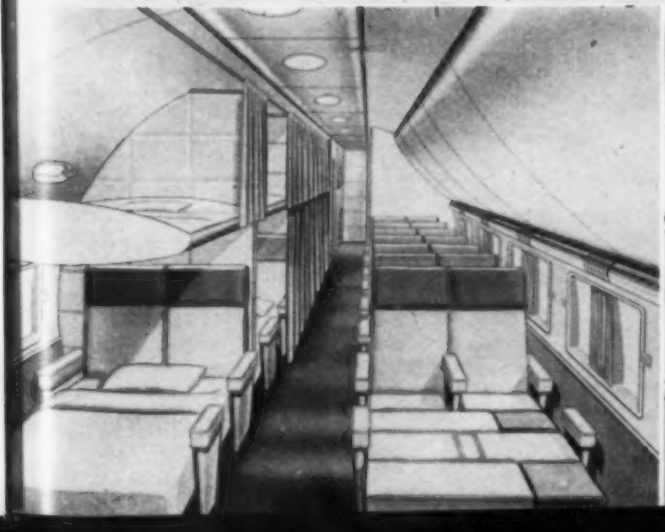
Crew—Transcontinental: 3 members in operating crew; two in steward's department. Transocean: 4 members in operating crew; 3 in steward's department.

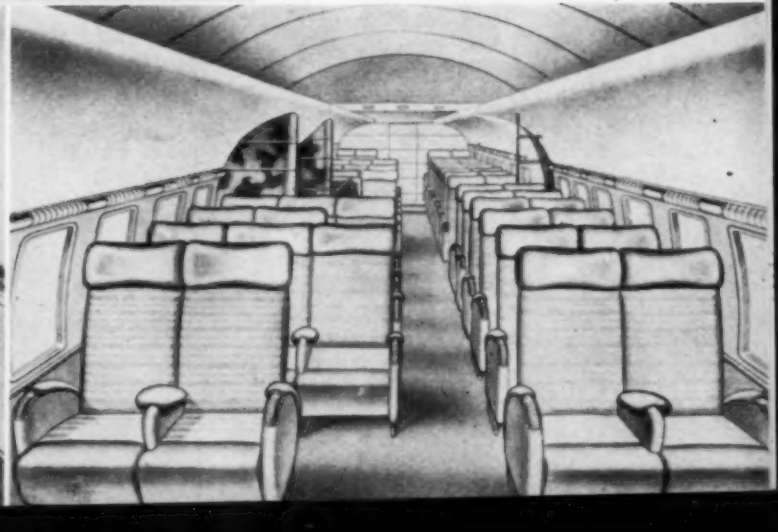
Direct operating cost—Passenger version: 1 cent per passenger-mile. All-cargo version: 5 cents per ton-mile.

Figure "8" fuselage section is illustrated by this view, with lounge and staircase below and main cabin above.



versions of Stratocruiser are represented by drawings below. At left is sleeper cabin, ving upper and lower berths. At right is a day coach version seating up to 100 passengers.
—(Boeing Drawings.)





YOU ASKED FOR IT

The Safety Bureau continues its campaign for simplified Civil Air Regulations with a draft of additional revisions for Parts 20, 43 and 60.

AIRMEN interested in the rationalization and simplification of Civil Air Regulations will be pleased to learn that their suggestions are receiving the attention of the Civil Aeronautics Board Safety Bureau. Witness to this fact is newly announced revisions of parts previously submitted for comment. National response has been substantial and the most recent revisions derive from interested airmen who are taking the time to send in their ideas and suggestions to Washington for consideration.

As a result of their suggestions, proposed changes for Parts 20 (pilot certificates), 43 (non-air carrier operations) and 60 (air traffic) previously reported in these columns, have been revised once again and part 20 is reprinted herewith for your study and reaction. Proposed changes in Parts 43 and 60 will be reprinted in these columns next month.

The adoption of these parts in their final form will represent the completion of the first phase of the CAB's announced project of modernizing Civil Air Regulations. Highlights of the items which have been further modified include: removal of all weather restrictions on flights below 1,000 feet when visibility is not below one mile (except in controlled zones where considerable traffic is to be encountered); elimination of a considerable portion of written examination in connection with navigation and meteorology for private pilot certificates; elimination of spins in private pilot flight tests; increase from twenty to forty hours instrument flying experience for instrument rating; elimination of requirement for logging flying time except for purpose of substantiating recent experience for certain ratings; inclusion of limitation on aerobatics in the interest of safety; inclusion of "contact" flight rules under "general flight rules," which will govern all flights except under instrument conditions.

The complete proposed revisions of Part 20 follow:

PART 20—PILOT CERTIFICATES

20.0 ISSUANCE OF CERTIFICATE AND RATINGS

20.00 *Certificate.* A pilot certificate will be issued by the Administrator to a responsible applicant who meets the minimum requirements prescribed herein for any one of the following classes:

(a) student pilot,

(b) private pilot,

(c) commercial pilot.

20.01 *Rating record.* A rating record with one or more of the following ratings will be issued by the Administrator in connection with the pilot certificate. The pilot classification, the type of aircraft, the airplane class and horsepower rating, and such ratings as entitle the holder to instruct students or to pilot aircraft under instrument conditions will be prescribed on the rating record.

20.1 STUDENT PILOT RATING

20.10 *Age.*

(a) Powered aircraft—16 years.

(b) Gliders—14 years.

If an applicant is less than 21 years of age at the time of making application, he must submit with his application the written consent of either parent or legal or natural guardian to the issuance of the pilot certificate sought.

20.11 *Citizenship.*

(a) A citizen of and of unquestionable loyalty to the United States, or

(b) A person who is in sympathy with the objectives of the United States and who is a trustworthy citizen of a friendly foreign government not under the domination of or associated with any government with which the United States is at war.

20.12 *Education.* An applicant who is unable to read and understand the English language must have an appropriate operation limitation entered on the student pilot certificate.

20.13 *Physical standards.*

(a) Applicant for a powered aircraft student pilot rating must meet the physical standards of the third class prescribed in Part 29.

(b) Applicant for a glider student pilot certificate must certify that he has no physical defect which renders him incompetent to pilot a glider.

20.14 *Aeronautical knowledge.* No requirement. However, a student pilot, prior to the first solo cross-country flight in powered aircraft, must pass a written examination on the pertinent provisions of Part 43 and those of Part 60 dealing with general flight rules and on safety practices and procedures. In addition he must demonstrate his ability to interpret aeronautical charts.

Note: A pamphlet covering all the information necessary for this examination will be furnished each applicant.

20.15 *Duration.* A student pilot rating will continue in effect for twenty-four months from the date of issuance unless suspended or revoked.

20.2 PRIVATE PILOT RATING

20.20 *Age.*

(a) Powered aircraft—16 years.

(b) Gliders—14 years.

20.21 *Citizenship.*

(a) A citizen of and of unquestionable loyalty to the United States, or

(b) A person who is in sympathy with the objectives of the United States and who is a trustworthy citizen of a friendly foreign government not under the domination of or associated with any government with which the United States is at war.

20.22 *Education.* The applicant must be able to read and understand the English language. A citizen of Puerto Rico need not meet these requirements, but in any such case appropriate operation limitations may be entered on his airman rating record.

20.23 *Physical standards.*

(a) Applicant for a powered aircraft rating must meet the physical standards of the third class prescribed in Part 29.

(b) Applicant for a glider rating must certify that he has no physical defect which renders him incompetent to pilot a glider.

20.24 *Aeronautical knowledge.*

(a) Applicant for a powered aircraft rating must have passed the written examination prescribed in §20.14.

(b) Applicant for a glider rating who does not have a powered aircraft rating must pass a written examination on those sections of Part 60 dealing with general flight rules.

20.25 *Aeronautical experience.*

(a) Applicant for a powered aircraft rating must have logged ten hours of dual flight time and thirty hours of solo flight time in three-control aircraft, including instruction in recovery from spins, or seven hours of dual flight time and twenty hours of solo flight time in two-control nonspinnable airplanes. At least five hours must have been logged within the sixty days immediately preceding the date of application. As part of the foregoing requirements the applicant must have logged at least three hours of solo cross-country flying including one flight to a point not less than fifty miles distant from the point of departure with at least two full-stop landings at different points along the course.

(b) A graduate of the private pilot course of a certificated flying school will be deemed to have met the requirements of this section if he presents his certificate of graduation and makes application within thirty days after graduation date.

(c) An applicant for a glider rating must have logged at least 100 gliding flights, twenty-five of which must have included a 360-degree turn and at least five of such twenty-five flights must have been made within the sixty days immediately preceding the date of application.

20.26 *Aeronautical skill.*

(a) Applicant for a powered aircraft rating must demonstrate his ability to competently perform the following maneuvers:

(1) a series of three landings from an altitude not to exceed 1,000 feet with engine throttled and a 180-degree change in direction, the aircraft touching the ground in normal landing attitude within 150 feet either side of a designated mark. At least one landing must be accomplished from a forward slip;

(2) three moderately-banked figure eights either "on pylon" or "around pylon", variation in altitude not to exceed 200 feet;

(3) a 720-degree power turn in each direction in a banked attitude of not less than sixty degrees, variation in altitude not to exceed 200 feet;

(4) maneuvers at minimum controllable speeds and recovery from power-on and power-off stalls entered from straight flight and turns; and

(5) When the applicant's medical certificate shows a structural defect or limitation, such additional maneuvers and tests as may be found necessary by the Administrator to demonstrate the competency of the applicant to pilot aircraft safely. A pilot certificate issued under these circumstances may

(Continued on page 88)

Small But Profitable

Charter work in lightplanes has proved good business in Oklahoma. A veteran operator passes along valuable tips for others.

By WALTER D. MAUK

WE'RE doing a good charter business in our territory, and we're doing it with light planes. Taking advantage of the tough transportation situation as it affects busses, railroads, and airlines, we're flying people from our trade territory in and around Blackwell, Oklahoma, to places about 300 miles away on the average, such as Tulsa, Wichita, Oklahoma City, Kansas City, St. Louis, Amarillo, Fort Worth, Dallas, Lubbock, and Denver.

We're using a Stinson Voyager and three Taylorcrafts. One of the Taylorcrafts is a deluxe job with two-way radio and all the trimmings. This one will cruise at 105, the Stinson at 95, and the others thereabouts.

From experience, we've learned that the greatest number of charter trips are for one passenger. For such work we use the Taylorcrafts, and even on trips into the Rockies we have no altitude troubles and no worries about the size of airports. There have been no complaints on the score of discomfort as the seats are roomy and comfortable.

For two passengers we use the Stinson. Although it costs slightly more to operate, there is a saving through opportunity to "split the bill." The Stinson operates at $4.42 per hour including depreciation, gasoline, oil, oil changes, and maintenance.

The Taylorcrafts run about $3.85 per hour for the same items, and this impresses us as being most satisfactory.

We charge 20 cents a mile for one passenger, 25 cents for two, and no extra charge for return trip. We do charge a dollar an hour waiting time at the other end of the run, or a flat $15 per night if the passenger wants us to wait over.

Half the job of doing charter business on any scale is the marketing of the service. We go out after business, rather than waiting for it to come to us. To begin with, we secured telephone directories from all of the towns in our territory. Blackwell has a population of 10,000, but the surrounding trade area runs the total up to 65,000. From the phone books we built a mailing list of all business firms and professional men. Each month we send out a mimeographed penny postcard telling about our service and rates.

The Author

The choice of postcards over letters has a dual advantage. First was reduction in cost, second was the desire to get our story across without the trouble of opening and probably discarding a letter unread. The average business man will not take the time to read a letter, especially an advertisement, but he doesn't have to take time to open a postcard. He can merely glance at it and digest the contents.

Then to clinch the matter after the passenger is with us, we keep our offices, hangar, and planes exceptionally clean. This pays big dividends as the public doesn't care to ride in dirty, ill-kept airplanes.

We have found that our charter business was slow to start. We had to go out and work for it with direct mail and newspaper advertising. Most of our business now comes from the towns within a thirty-mile radius. We have to do everything possible to get the business and to keep it satisfied once it's with us.

At present Mrs. Mauk and I handle all of the charter flying, and we find

(Continued on page 78)

Postwar Outlook for AIRCRAFT MARKETING

No longer a sideline, aircraft sales must be handled as a primary business. Modern methods will make it efficient, profitable.

By W. A. MARA
Staff Executive
Bendix Aviation Corporation

DURING the past few years, the aircraft salesman has occupied a place in the background, while production, engineering and management went to town in a big way. Before long, the pendulum will swing in the other direction and sales must be produced if the business machine is to operate in high gear.

Too often lately I have listened to the optimistic view that the line of airplane purchasers will form to the right. Possibly it will be that way for a short time, but I am sure that any sales manager who tackles his job on the theory that it is a push-over has two strikes on him before he starts.

I firmly believe that the marketing of airplanes must be approached from a new viewpoint. This new viewpoint, expressed very simply, is that from the standpoint of the dealer or distributor, the business can be made to pay; that it has a profitable future which will grow in direct proportion to the properly directed effort we apply.

This new viewpoint may not seem sensational. Yet it is a new conception. Before the war the sale of airplanes was in most cases an adjunct, and the average dealer's or operator's main business consisted of running a flying field; selling service and hangar rentals; giving flying lessons; operating a taxi or charter service, and finally selling airplanes or taking airplane orders as a side line.

Sales Manager's Outlook

So here is the comparison. The sale of airplanes was once regarded as a side line. From now on it must be regarded as a primary business. To back up the sales end of the business and to broaden his profit producing here, the alert dealer will also sell service, hangar rentals and may possibly operate taxi and rent-a-plane services and a flying school. This is the new approach which, if properly organized and forcefully conducted, will pay dividends.

Let's take a look at what is probably going on in the mind of every airplane sales manager. After that we will try to probe the prospective dealer's thoughts.

The sales manager knows he will have a much wider market. Just how much greater it will be he can't know with certainty until the battle begins.

In its essence, he knows that selling consists of:

1. Locating the prospect.
2. Demonstrating the product properly.
3. Closing the sale.

I wish these steps were as easy as they sound and that competition were not as tough as it promises to be.

Therefore, I predict that more thought and effort will be put into the careful selection and training of factory sales and service staffs. They must be high caliber men, capable of selling the franchise to the dealer, and also capable of working with and training the dealer's sales and service organization.

The author of this timely and authoritative analysis, adapted from one of the National Aviation Clinic's outstanding addresses, is shown here (left) being greeted by Ernest R. Breech, president of Bendix Aviation Corporation, of which Mara is a staff executive to co-ordinate Bendix product developments relating to the personal airplane.

I want to stress service in connection with sales because it properly and profitably belongs there. Prewar service ranged from indifferent to very poor, and cost the customer too much time and money. Instead of having to fly to the factory or some distant station, he will expect service in his home town. The man who serves him must not only understand the mechanical problems involved, but must also be able to talk convincingly about the sales points of the airplane. To give proper service, an adequate stock of parts must be carried and the smart factory sales department will follow current automobile practice in seeing that dealers are not overstocked and that adjustments in inventories can be made to correct for slow-moving items.

I am sure a great deal more assistance will be given to dealers in the form of advertising campaigns, sales and service manuals, booklets, posters, pins, comparison charts, prospect lists, radio talks, and other dealer helps. Both factory and dealer sales forces must be trained to use these tools properly.

I believe many factories will institute sales schools where pilots can be trained as salesmen and furnished to dealers on request. I believe also it will be a condition of many franchises that the dealer agree to send his men to these schools. Some way must be found, even before the end of the war, to arrange a sales program in which Army and Navy pilots and ground force men can participate.

The sales manager must have an answer to the hangar problem. Before the war, hundreds of airplanes had to be staked out in the open, day and night, where they presented an open invitation to damage by the elements. Believe it or not, there are 160 full-fledged hurricanes which strike the United States each year. They prey on the airplane left in the open with consequent damage to the owner's pocketbook, and also help to maintain the high level of insurance rates.

Many companies now have hangar designs. Possibly the airplane dealer

(Continued on page 81)

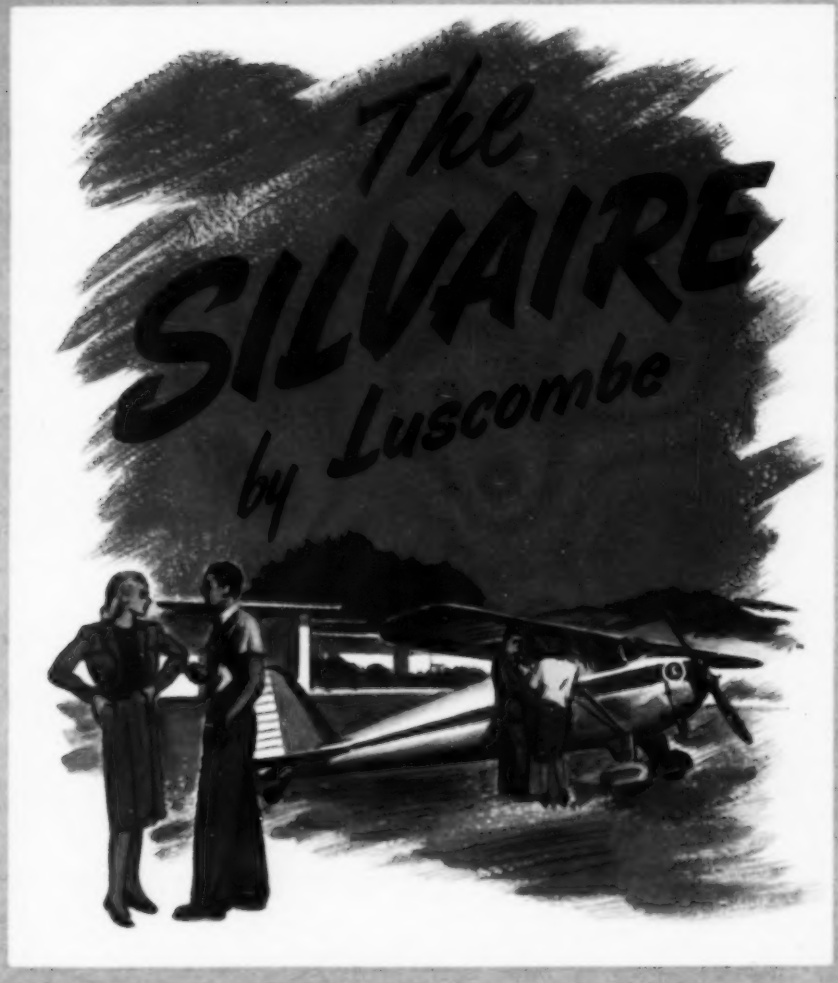
Your all-metal, all-purpose, postwar plane

WEEK-END SPORT

AIR-TOURING

BUSINESS CALLS

HUNTING and FISHING



ENGINEER and PROSPECTOR

AIRPORTS and SCHOOLS

FARMER and RANCHMAN

Before the War, the Silvaire by Luscombe had become established, through four years of service, as an outstanding value among planes designed for personal use.

During the War, the Silvaire has been used with noteworthy success by the C.A.A.-War Training Service, the Civil Air Patrol, and the Armed Services, at home and at the front. At the same time Luscombe has been busy making key elements for many famous war planes.

After the War, the Silvaire will again be an outstanding investment because of its all-metal strength and long life, its easy maneuverability, its low cost of operation, its speed and range.

Territory is Open for Distributors and Dealers

For Pleasure or Business, the gleaming, breath-taking beauty of the Silvaire will confer prestige on those who employ it; removing barriers of time and distance with welcome ease and economy.

For Present Owners, the War Production Board has released an ample supply of parts, thus securing maintenance of the four-year pre-war production of Silvaires which continue in constant and important use.

For Prospective Owners, our tentative plans for resumed production promise early postwar delivery; you are invited to write for particulars. The Postwar Silvaire will be attractively priced, with convenient payment terms available.

Luscombe Airplane Corporation, Trenton 7, New Jersey

CONFESSIONS *of a Flight Instructor*

PART II

Students must be intelligently analyzed. An instructor who understands his pupil can teach almost anyone to fly in time.

By A. H. KNOUFF
Lt., A-V (T), USNR*

WHAT has a penitentiary got to do with flight instruction? Well, a penitentiary is a world in itself — small enough that a psychologist could analyze the jobs to be done and then try to fit the inmates to the jobs by psychology tests. It is possible to determine the most suitable vocation for any one—if you could analyze every possible type of work. Therefore it should be possible to work out tests to determine who will make good pilots. However, this has not been done yet and the average flight instructor is not likely to bother with any elaborate tests. Yet, like many hard-boiled business men who scoff at scientific tests as a means of picking employes, the flight instructor must analyze his new students in order to determine how to teach them—or whether to teach them.

Notice I did not say "whether they can learn to fly." I have never found anyone who could not learn to operate an airplane if given enough time. I know several boys who were washed out of CPT classes because instructors decided they could not be taught to fly in the limited time allowed by these programs, and who went into the Army or Navy and made the grade.

I would like to mention the name of one of these in the hope that he may get in touch with me to confirm or deny my contention. We all liked him very much personally, but four experienced instructors gave him up as a pilot. His air work was good, but when he got near the ground he usually went to pieces. An accident early in his training may have caused this.

When I told him what no instructor likes to tell a student, he took it with better spirit than any I have known. He thanked me for being honest with him, but he thought I was wrong and was determined to prove it. I told him that if he proved me wrong I would be happier than he was about it. I hope that Freddy reads this and lets me know how he came out.

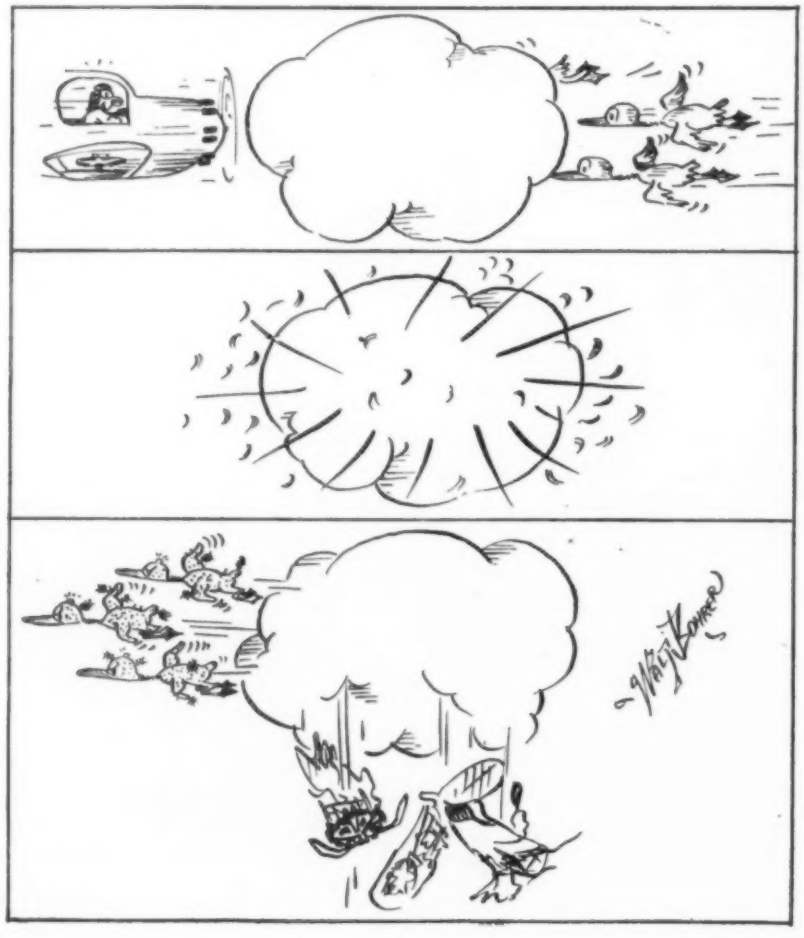
Each student is an individual problem. It is sometimes hard to remember this when you have pulled the throttle on a couple hundred students and had every one of them kick rudder and haul back on the stick. This is the sort of thing that gives instructors premature gray hairs, but the fact that all students are fundamentally alike gives the instructor a foundation on which to base his analysis of the student.

Students Are Either Mental or Mechanical

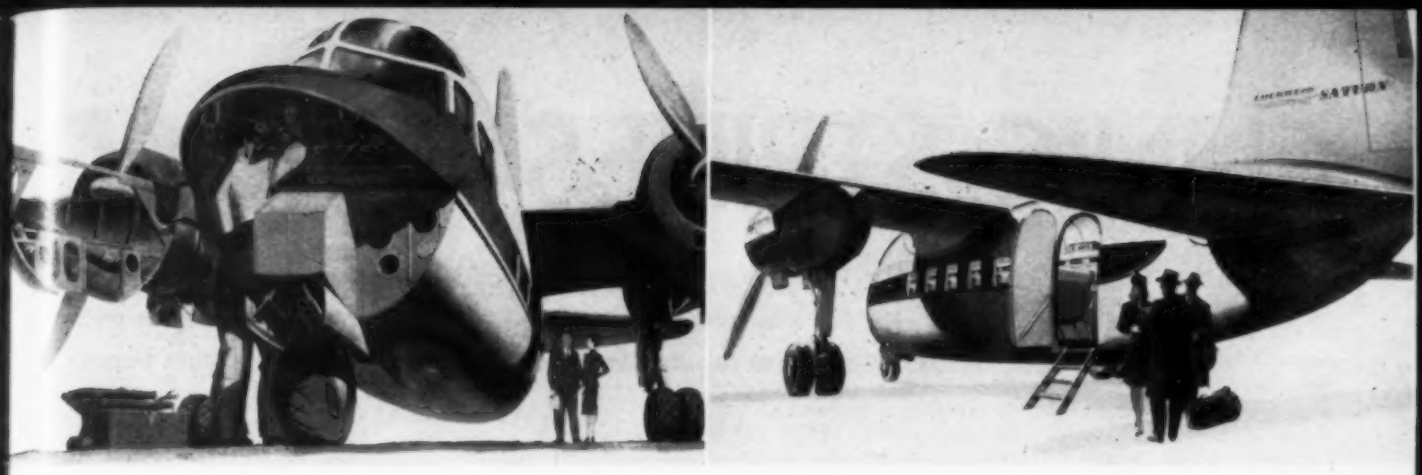
Psychologists divide all people into two main types—introverts and extroverts. For the purpose of the flight instructor I think it is easier to call them mental and mechanical types. The mental type learns more from explanation and the mechanical type learns more from demonstration, or by doing it himself.

Of course instructors, being human, also fall into these classes. Some can teach better with words, while others rely mostly on action. That is one big reason why some students will get

(Continued on page 84)



*Opinions and assertions herein are the author's, and are not to be construed as official or reflecting the views of the Navy Department or the naval service.



Short-haul high-frequency airline requirements are said to be met by Lockheed's new Saturn 75, fourteen-passenger feeder design. Simplicity of maintenance, indicated by drawing at left, and interchangeability of parts are emphasized in the plane's design. —(Lockheed Drawings.)

Lockheed's Feeder Design

THE first high-wing model since the Vega has been announced by Lockheed Aircraft Corporation as the Saturn, Model 75, a twin-engine, fourteen-passenger, 200-mph. airplane specifically designed for short haul, small airport operation.

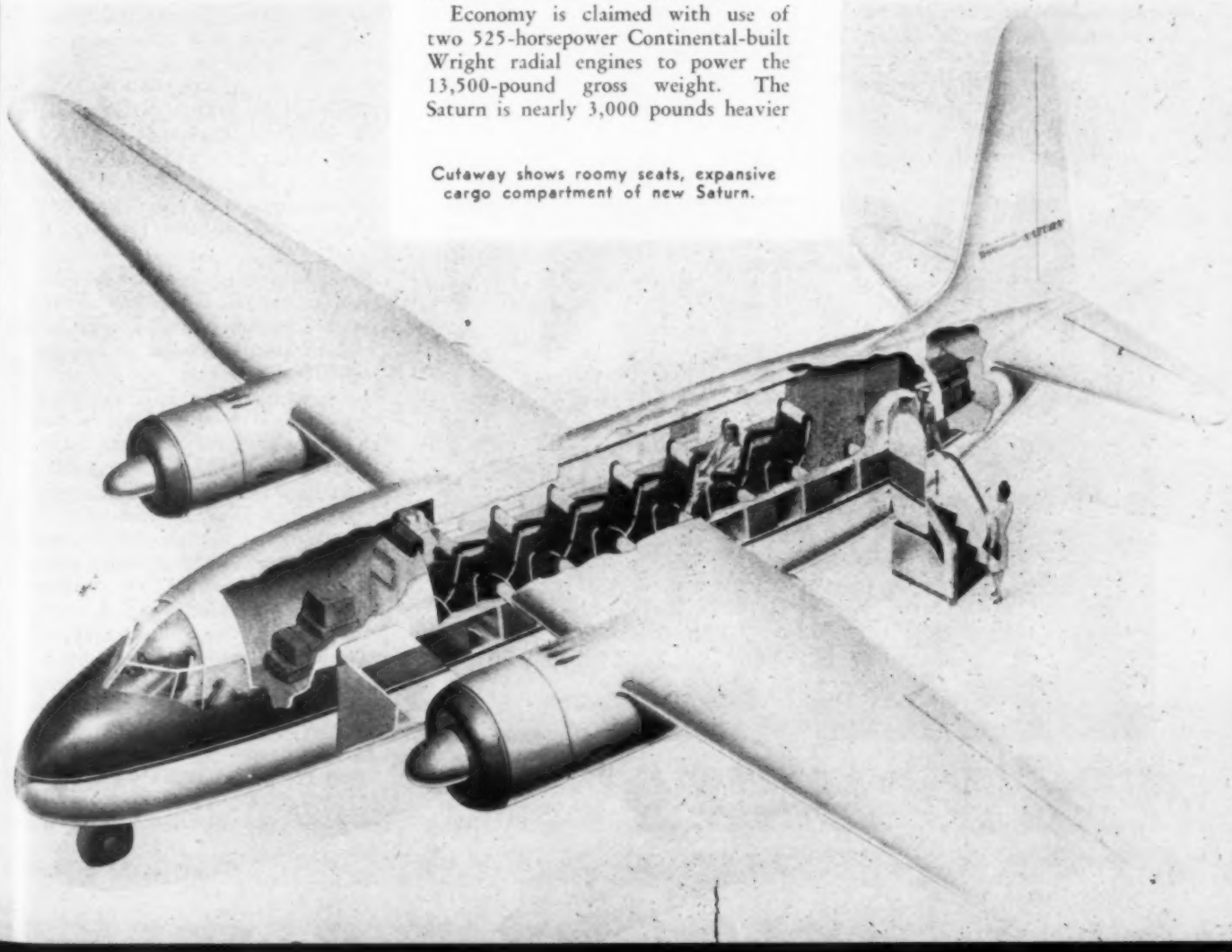
Tricycle retractable landing gear, large cargo compartment with moveable cargo bulkhead, and arrangements for two pilots, are in line with the specifications brought forth by the Feeder Airlines Association last month.

Preliminary performance specifications claim 1,055 feet take-off distance, landing speed of seventy-three miles per hour, 1,230 feet per minute climb, 26,000-foot service ceiling, and ability to maintain 14,200-foot altitude with one engine inoperative.

Economy is claimed with use of two 525-horsepower Continental-built Wright radial engines to power the 13,500-pound gross weight. The Saturn is nearly 3,000 pounds heavier than the Lockheed Electra, but cruises twenty mph. faster with about the same power, reflecting improved aerodynamic efficiency.

Major components of the plane, such as elevators, fins, rudders, stabilizers, landing wheels, and power plants are readily interchangeable.

(Continued on page 86)



Cutaway shows roomy seats, expansive cargo compartment of new Saturn.

CLINIC STRIDES AHEAD

The National Aviation Clinic gained ground in the drive for a united aviation front. Settlement of differences over uniform regulations and airport expansion appears nearer.

By TOM ASHLEY

VALUABLE contributions to aviation progress were made at the second annual National Aviation Clinic in Oklahoma City last month. It developed significant planning and ideas representative of many phases of aviation. Some of these ideas and plans were translated into resolutions, and during the months to come emissaries representing the Clinic will seek their incorporation into the aviation activities of Congress, government agencies, the states, the industry, organizations and associations. But not all the Clinic's worthwhile accomplishments were achieved in resolutions. Although some of its speakers and debaters failed to inspire any whereases and be-it-resolved's, they did provide worthwhile evidence of significant trends which might have profound future effect on aviation. Over a thousand delegates and participants were there, and after four days of oratory and airing of differences, most of them came away enlightened on aviation needs in government, private flying expansion, airports and traffic control, transportation, fixed-base operations, education and national defense.

State aviation legislation was one of the important matters aired at the Clinic, but not resolved upon. Another was the opposition of municipalities to the Civil Aeronautics Board's proposal for Federal-state, instead of Federal-city, operation of the projected billion dollar national airport plan. But there was plenty of debate on these topics, bringing into the open a lot of opinions and facts on which future planning may be intelligently charted. That there is need of such charting was amply proved by the divergence of views expressed.

The conflict on legislation and airport financing proved the value of the Clinic's democratic functions, for even if a stand could not be reached, there was strong evidence that settlement can be attained through further discussion and mediation. As a result unity appears to be nearer, and solutions for the benefit of all aviation appears in the making.

State Objectives Clarified

In the matter of aviation regulations, the proponents of state legislation were more impressive than they were a year ago. More than a few Clinic followers recognized the improvement of their position, and a member of the CAB, Oswald Ryan, departed from a prepared speech to hand the National Association of State Aviation Officials a compliment for its efforts in behalf of uniform legislation. He referred to proposals drafted by NASAO for uniform state codes in which co-ordination and co-operation with Federal legislation are provided. Where lusty critics of Federal functions previously threatened U. S. control with loose talk and generalities, NASAO's views were expressed this time with more logic and clarity, and constructive planning was offered along with calm criticism.

One of the major causes of opposition to state aviation activities has been the fear of such restricting regulations as state licensing of aircraft and airmen. Speaking of state rights in regulating aviation, Sheldon B. Steers, director of the Michigan Board of Aeronautics, agreed such licensing should not be exercised, "at least not at this time." The problem, he said, is one of co-operation between the U. S. and the states. "To me the question isn't the right of a state to regulate aviation," Steers declared, "it's more the question of the right a state already possesses that should be exercised in the regulation of aviation — and the same applies to the Federal government." He cited the following as "certain thoughts we can begin with" in defining state and Federal functions:

1. The issuance of certificates of competency and airworthiness should be a Federal function; the states should back them up with law and enforcement to the hilt. 2. Promulgation of safety regulations and "rules of the road" should be a Federal function; the states should incorporate them in their aeronautical codes to permit co-operation of state and municipal agencies. 3. Development of a national airport plan should be Federal responsibility; such plan should be fully co-ordinated with the states and their political subdivisions. Promulgation of aeronautical standards and classifications of airports should be a Federal function; states should recognize and adapt them. 5. States should have general supervision over the design, location, construction and maintenance of all airports and be responsible for their adaptation to national standards, classification and place in

Oklahoma City's important sessions were conducted in the state capitol's house of representatives, presenting this busy scene of the speaker's rostrum and rows of delegates' desks. Over 1,000 participated as officials and observers.
—(Daily Oklahoman Photo by Joe Miller.)

the national airport plan; the Federal government should co-operate in an advisory capacity as to the planning, standards and classification. 6. Licensing of airports other than those of the U. S. government should be a state function; the Federal government should refrain from certificating or licensing in the airport field.

Directly opposing state aviation regulation, Dr. John H. Frederick, professor of transportation and industry at the University of Texas, told the Clinic the Federal government "has pre-empted the entire field of control and regulation of air transportation, private and commercial."

State Perils Cited

Dr. Frederick's remarks dealt chiefly with air transport, but he declared: "Today it should be recognized that aviation in all its phases is so inherently national in character that it requires absolute uniformity of regulation affecting all planes, all pilots and all instrumentalities of air commerce alike. Modern air transportation cannot recognize state lines; it requires uniformity of regulation and firmness and finality of control."

He continued: "Suppose one of several states should undertake to regulate the matters over which the Federal government already has jurisdiction, even though the state regulations at least nominally follow the Federal rules, what public benefit can be obtained from having two sets of substantially the same rules and regulations governing aviation, administered by two separate and distinct agencies? Also, suppose there were conflicts between the Federal and state rules and regulations, or suppose they were applied and interpreted differently by the two agencies, should those in aeronautical activities conform to the procedures required by the state rules and regulations or the Federal? Again, if the Federal agencies issue a certificate of public convenience and necessity, an aircraft and airworthiness certificate or an airman's competency certificate or license, and signify their approval of airline operations and maintenance manuals, navigation facilities and various operating procedures, and then the state agency in the conscientious exercise of its judgment and discretion, upon the same showing, should reach different conclusions and refuse to issue like certificates or give like approvals or cancel or suspend such certificates or revoke or change such approvals, what will be the status of the air carrier?

"A carrier or a private flier conforming strictly to the Federal rules and regulations might be charged with violations of state rules and regulations, and one conforming to state rules and regulations might be charged with violations of the Federal rules and regulations. To quote from the 1941 report of the American Bar Association's Committee on Aeronautical Law: 'Only through Federal regulation can the desired uniformity be obtained completely and expeditiously. Even if the actual law remains uniform with other states, there is no

Resolutions Stress Aviation Needs

Twenty resolutions were adopted at the National Aviation Clinic. Reflecting the Clinic's major accomplishments, the resolutions call for action in many fields. Through them, the Clinic:

Endorsed reduction of aviation regulations to enforcible minimum and favored a simple system of uniform regulations as recommended by Aero Chamber of Commerce's Personal Aircraft Council.

Urged Federal, state, municipal and private agencies and communities to plan now to build airports, airparks, flight-stops and air harbors, and recommended that no general restriction be placed on location of landing facilities and air traffic control zones.

Commended to state and local governments the desirability of exempting from taxation land dedicated to free and non-revenue producing public use as airports, either temporarily or permanently, in manner of land dedicated to public welfare.

Opposed principle of leasing or otherwise granting exclusive vending privileges for aviation petroleum products at public airports, but at same time recognized that at airports with small consumption such exclusive privileges may be consonant with public interest so long as they do not apply to airlines or government aircraft.

Asked Congress to enact legislation giving states or their political subdivisions or municipalities priority on acquisition of surplus U. S. airports and providing for government aid in maintenance.

Urged that all revenues derived from government aviation taxes and government profits from aviation services be utilized specifically to foster aviation.

Urged immediate provision of additional funds to continue CAA control of airport and airway traffic.

Emphasized need for immediate adoption of and rigorous adherence to surplus aircraft disposal policies already recommended by the Inter-Departmental Committee, and establishment of working regulations consistent with such policies.

Urged government agencies to effect contract terminations along following principles: (1) divorce material accountability from financial aspects, (2) due allowance for momentum costs in terminating contracts in their entirety, (3) utilize partial final settlements, (4) eliminate technicalities now hindering promptness.

Recommended (1) CAB efforts to extend scheduled air transportation to smaller cities and towns, (2) CAB acceleration of hearings on applications for such air service extension, (3) government planning and promotion of legislation creating national system of air parcel post, (4) ear-marking of air postal profits for expansion of such postal service and appropriation of further funds to carry out air service expansion.

Favored preservation of private ownership and management of air services under reasonably regulated competition.

Endorsed ACCA's air power policy for U. S. to maintain sufficient air power not only to win this war but to keep the peace.

Favored establishment of unified executive department of U. S. having control of plans, indoctrination and training of all combat forces as well as plans, control, production and procurement of war supplies, with each of the defense forces administered separately within such an overall department.

Urged expansion of aviation research by government and private enterprise as a national security essential.

Recommended state legislation enabling local school authorities to incorporate approximately four hours of flight experience as laboratory exercises in connection with high school aviation studies, and urged such flight experience, insofar as practicable, to be given under contract with private enterprise operating CAA-approved flight schools.

Urged educational institutions to provide aviation courses, including flight training, wherever practical in "GI educational programs," recommending that such flight training, insofar as practical, be given by CAA-approved flight schools operated by private enterprise.

Recommended creation of standing committee on aviation education to co-operate with existing agencies and aviation industry.

Favored legislation permitting suits against government for liability for accidents caused by government aircraft.

way whereby the regulations can be kept so all the time. The Federal government has, through the Civil Aeronautics Act of 1938, virtually preempted the field of regulating aviation'."

Les Schroeder, Minnesota Aeronautics Commissioner, rising during the discussion which followed the Steers and Frederick talks, said state aviation officials "don't think it should be necessary to place all the irons in one basket," referring to Dr. Frederick's Federal opinions. "We have the right," Schroeder said, "to develop some trade areas to best advantage of those areas and we're going to do it." He said NASAO had just completed drafting uniform state legislative codes on aviation and pointed out that unanimity among state officials posed a challenge for a solution to legislative problems. Later, CAB Member Ryan spoke praise for NASAO, congratulating state aviation officials for their efforts on the uniform legislation proposals, which he described as being "replete with excellent material."

George Haddaway, editor of SOUTHERN FLIGHT, who presided as leader of the discussion, asked Schroeder if there were any cases of Federal violations by unlicensed pilots flying uncertificated planes, and Schroeder said there were two such cases in Minnesota, with the CAA failing to act effectively. Dudley Steele, manager of the Lockheed Air Terminal, said local California law officers halted two such cases. Alfred MacDonald, Wichita, Kansas, park commissioner, entered the discussion to say he didn't believe the states have a place in air regulations. Instead of a state aviation department, MacDonald preferred a governor's advisory committee, and he also opposed Federal airport funds being handled by states, declaring himself in favor of direct dealings between the U. S. and municipalities.

Municipal Fight Aired

Federal, state and municipal rights came up again the next day when the Clinic took up airport problems. Charles S. Rhyne, executive director, National Institute of Municipal Law Officers, championed the right of municipalities over state to deal directly with Washington on U. S. airport financing and planning and stirred up several minutes of heated debate. Before he was through he was battling not only the state officials but Congressman Jennings Randolph, and government representatives, including G. W. Burgess, assistant to the assistant secretary of commerce for air. Burgess warned that a fight between aviation interests now would endanger the national airport plan as a whole, and urged opposing sides to reach an agreement.

Several major cities entered the discussion. Mayor Ben Stapleton of Denver emphasized that his state had never spent a cent to benefit Denver's airport and he didn't see where the state had any place in Denver-U. S. airport activities. Los Angeles' mayor rose to agree with Rhyne's opposition to state aviation activities. Kansas City's city manager, Harry Cookingham, took the middleground by suggesting a compromise, with the states having aeronautics commissions continuing to handle funds and those not having state commissions allowing municipalities to handle their airport matters directly with the U. S. Congressman Randolph called for united efforts in the matter, urging full coordination of the airport project, for which his bill in Congress would provide over a billion dollars.

T. P. Wright, Civil Aeronautics Administrator, defended the CAA's recommendation for U. S.-State relations for the proposed airport program. The municipal vs. state problem is a difficult one, he admitted, but CAA studied it a long time and is depending on Congressional debate for a lot of answers. If the Randolph formula for distributing U. S. funds becomes inefficient, he said, it will be modified—but it will be used to initiate the program. Hubert R. Gallagher, counsel for the Council of State Governments and the Governor's Conference, said the states are ready to endorse the Randolph plan. He emphasized that the states have a huge surplus of funds at the moment, placing it at "several billion dollars."

Wright Challenges Industry

Despite such discussions, proof of the growing widespread interest in state aviation legislation, both for and against, the Clinic took no action when time came for resolutions. State aviation officials will press for adoption of their uniform codes throughout the nation, and opposing municipal officials will continue their fight for U. S. airport funds.

The role of the personal airplane in tomorrow's America was brought out in a section featuring talks by J. Carlton Ward, Jr., president, Fairchild Engine and Airplane Corporation; John E. P. Morgan, manager, Personal Aircraft Council, Aeronautical Chamber of Commerce; Leslie E. Neville, editor, *Aviation*, and William A. Mara, Bendix Aviation Corporation. Little information not already generally known was developed in the discussion of future aircraft performance and specifications, but Ward, true to the conservative attitude for which he is well known within the industry, injected a sobering note by warning that cheap prices won't be available in personal planes immediately following the war, due to high manufacturing

WNAA MAPS EXPANSION PLANS

By MARION MELCHER

Meeting in Oklahoma City last month during the National Aviation Clinic, the Women's National Aeronautical Association adopted four national projects, endorsed the movement for separate divisions of the Army, Navy and Air Forces, elected new officers, upped their dues and shaped plans for 1945 activities in general. Fifty-four WNAA delegates attended, led by Mrs. Gordon Lynn Wright of Tulsa, president.

National projects, adopted on recommendation of Mrs. Eunice W. Mecaskey of Kansas City, will be:

1. A membership drive for 5,000 new members by March 31, 1946, and a WNAA unit in each state and Alaska, with a one-year complimentary membership for WASPS and other women in service connected with aviation.
2. Assistance with airmarking and establishment of airparks, flight stops and air harbors.
3. Definite study courses for all Units.
4. Promotion of air power.

New officers elected are Mrs. Gladys Dallimore, Pueblo, Colo., president; Miss Marion Bowler, San Diego, first vice president; Mrs. James Brazell, Oklahoma City, second vice president; Miss Vivian Jones, Pueblo, secretary, and Miss Lois Lake, Salt Lake City, treasurer. Board members elected are Mrs. Al Guthrie, Stillwater, Okla.; Miss Neva Rea, Kansas City; Mrs. Van Galder, Winnebago, Wis.; Mrs. Freda Cooper, Topeka, Kans., and Miss Hazel Surdley, Raton, N. M. Mrs. Wright, past president, was elected governor-at-large, and the following national appointments were effected: Miss Marion Melcher, Kansas City, editor; Mrs. Eunice W. Mecaskey, Kansas City, program chairman; Mrs. Stella Gulaian, Kansas City, finance chairman, and Mrs. Albert Kushner, Topeka, Kans., advisory chairman.

National Aviation Clinic notables included (left to right, above) Sheldon B. Steers, Michigan Board of Aeronautics Director; W. R. Kent, president, Southern Air Services, Memphis; William L. Anderson, executive director, Pennsylvania Aeronautics Commission; Herbert C. Clish, chairman, Air Age Education Committee, American Association of School Administrators; Alfred MacDonald, director of parks and airports, Wichita, Kas.; Kern Dodge Philadelphia engineer and resolutions committee chairman of the Clinic. —(Daily Oklahoman Photos by Joe Miller.)

costs. Wartime's so-called "mass production" has not slashed unit costs, he said, and aircraft engines still are more expensive than the average person believes. Mara's address, presenting an authoritative and timely outlook for postwar aircraft marketing, has been adapted as an article and will be found in this issue on page 32.

CAA Administrator Wright, although he was speaking on the subject of airports, entered the airplane discussion later when he challenged the industry to produce (1) a 150-mph., 4-place, all-metal family plane selling for about $2,000, (2) a landing gear of the full-swivelling, castered type to allow cross-wind landing and take-off on one-runway airports, and (3) an effective dampener to reduce or eliminate airplane engine noise. These developments, he said, will be necessary if the U. S. is to develop a 400,000-plane market within ten years, as he has predicted. A comprehensive review of the CAA master airport plan, about which Wright spoke, is found on page 47.

Free HP Time for Vets Hinted

A lot of people figure they'll fly war surplus planes until newer and better ones are available, either at Mr. Ward's or Mr. Wright's prices. In fact, approximately 6,500 war surplus personal planes have been sold already by the government in competitive bidding, according to Lt. Col. William Barclay Harding, director, Aviation Division, Surplus War Property Administration. A luncheon speaker during the Clinic, the Colonel emphasized, however, that surplus personal planes are the least of his worries—they aren't numerous enough. Eight of every ten sold have gone to fixed-base operators, dealers, corporate buyers and other aviation experienced persons; one dealer bought 133; one plane attracted thirty-nine bidders. The Colonel added that even the damaged ones are going fast—165, most of them without engines, offered in a recent DPC auction, went like hot cakes.

Regarding the disposal of surplus military trainers, Col. Harding touched on what might develop into a significant program—government-furnished horsepower time for returning service pilots to preserve the government's investment in their training. He said numerous postwar training programs are "in the making" and present policy is to "set aside most surplus trainers for use in organized training programs to be sponsored by Congress." It would be very beneficial to national defense to preserve the experience of men trained at government expense "by distributing the latest and best of the surplus war trainers to fixed-base operators around the country for the use of ex-service and reserve pilots" who probably could afford to fly regularly only the smallest aircraft, he explained.

Radar and other electronic devices received emphasis in Clinic addresses. Glen A. Gilbert, chief, Air Traffic Control Division, Civil Aeronautics Administration, said a chief item in future air traffic control will be a "collision warning device," having a screen on which would be shown the positions of all aircraft within a fifteen-mile radius. It should be the size and weight of a present-day compact radio receiver, and the screen would be about the size of an artificial horizon indicator or perhaps slightly larger. As for cost, such a device should be no more expensive than other instrument flight equipment necessary today, but economic limitations may result in a device indicating the positions of other aircraft only in the front hemisphere of the aircraft carrying the instrument.

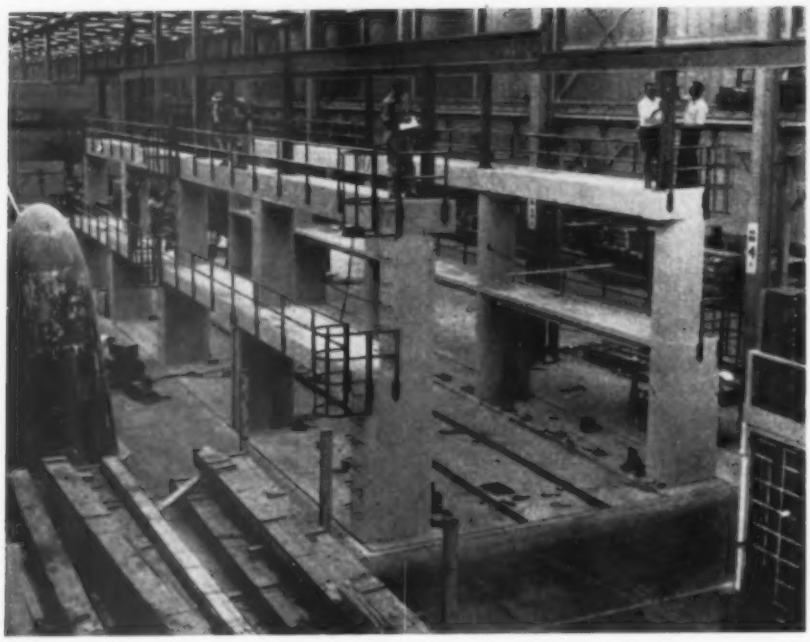
Wartime radar, when applied to postwar civil aviation, will make flying "quite as safe as sitting at home—safer, perhaps," the Clinic was told by Lt. Gen. B. K. Yount, AAF Training Command commanding general, who added: "On the question of safety, we have a hundred new devices besides radar."

In a section devoted to air transport, CAB Chairman L. Welch Pogue and others urged air carriers to extend their efforts from luxury business to the mass transportation market in order to enlarge that industry and extend air service to hundreds of new areas. Highlights of this section will be found on page ninety-six of this issue.

CAB Member Ryan told the Clinic of special studies now being made of taxation as it affects air transportation. Congress ordered the study, he said, and its objectives are that (1) air commerce shall not be subject to burdensome multiple taxation, and (2) inequalities in state and local tax policies shall not influence planning of air routes, operations, selection of equipment, and location of maintenance bases.

Space prevents coverage of all interesting developments at the Clinic. Its resolutions, condensed and published with this article, represent outstanding accomplishments by the participants, particularly the resolutions committee headed by Kern Dodge, Philadelphia engineer. All phases of aviation were ably represented by that committee's membership, and those who would serve aviation's interests should recognize the Clinic's resolutions and work for the goals they seek.

Because of the remarkable efficiency by which the Clinic functioned, Oklahoma City and the National Aeronautic Association, its sponsors, deserve widespread commendation. Stanley Draper of the Oklahoma City Chamber of Commerce and his associates, and Clinic Director Steadham Acker have steered the Clinic to an outstanding success for the second straight year. For the advancement of civil aviation it is to be hoped they will continue their efforts for an even greater Clinic in 1945. ★ ★ ★



The inaccuracies between lofting and tooling have been eliminated by straightedge positioning inside a stable dock — another engineering victory for aviation.

This huge master tooling dock now nearing completion at Consolidated Vultee's Fort Worth division is the largest three-dimensional positioning device ever installed for aircraft work.

World's Largest Tooling Dock

By H. S. KITTEL
Assistant Plant Engineer
Consolidated Vultee Aircraft Corporation
Fort Worth, Texas, Division

THROUGH the utilization of the world's largest master tooling dock at Consolidated Vultee Aircraft Corporation's Fort Worth division, heretofore unheard-of co-ordination between the master loft and the tooling department has been achieved by scribing grid lines which locate reference points in fairing an airplane.

The master tooling dock is a three-dimensional positioning apparatus which provides a mechanical means for setting up the locators on all types of assembly fixtures — in strict accordance with lofting information and under the dimensional control of templates derived therefrom. Its primary advantages lie in the fact that it automatically co-ordinates the job of fabricating three-dimensional assembly fixtures with accuracy and reliability that was previously possible only in fabricating second-dimensional detail assembly fixtures.

Foremost function of the dock is to represent the lines of the grid plane system of the master loft by means of physical members called "straightedges." There are four stationary longitudinal straightedges in the dimension of length, two movable vertical straightedges in the dimension of height, and two movable transverse straightedges in the dimension of width. The longitudinal straightedges represent station lines, while the verticals reproduce water lines and the transversals indicate buttock lines.

Working Bay Eighty Feet Long

Fundamentally, the accuracy of the dock depends upon the firmness of its foundation; and, naturally enough, the details involved here depend largely upon the geographical location. The foundation for the world's largest tool dock at the Consolidated Vultee's Fort Worth division, was designed to carry a 4,500,000-pound load and to resist and nullify vibrations caused in the operation of nearby equipment. Completely independent of surrounding building structure, this base is of reinforced concrete, supported on a continuous footing four feet by five feet deep on solid earth.

Embedded in the base are loading rails, which are used to locate the structure of the assembly tool during dock set-up operations. Projecting above the base are vertical monolithic columns and catwalks bounded by reinforced steel. These columns carry a structural steel superstructure which supports the upper longitudinal straightedges, guard rails, ladders and crane rails. The lower longitudinal straightedges are supported directly by angle blocks, which are held in place by studs sunk into the concrete of the base.

All four longitudinal straightedges are secured by micrometric adjusting screws, which may be used in aligning the straightedges in true parallel relationship with one another. The alignment of these straightedges may be accomplished within a tolerance of plus-minus .001 inch in lengths up to sixty feet by means of electrically-energized wires, an electronic mercury level, and master gages.

Drilled in one side of each movable and fixed straightedge is a straight line of .500-inch diameter bushed holes, evenly spaced on 10.000-inch centers which correspond with the grid lines of the master loft. On the longitudinal straightedges, these holes are positioned diametrically opposite one another in transverse plane parallel relationship by means of trammel gages. Further, the holes are numbered for reference and identification; and, due to the accuracy of their 10.000-

inch locations, they are used as the basis for all positioning.

Besides the evenly-spaced holes, the straightedges all have two major features in common: (1) Each has a "T" slot running its full length for use in clamping certain accessories once they have been positioned; and (2) each has a ribbed working surface which has been carefully machined and then scraped or ground to reduce surface irregularities. The dock illustrated in this article has vertical straightedges which are eighteen feet in length, transverse straightedges which are fifteen feet in length, and longitudinal straightedges which are eighty feet in length; therefore, it has an eighteen by fifteen by eighty foot working bay or envelope. Due to machining limitations, it has been found advisable to make the straightedges in units of not more than twenty feet, even though their total lengths may be considerably more. The tooling docks built so far have therefore been in unit lengths of twenty, forty, sixty, and eighty feet respectively.

Positive Dimensional Control

Either one or two transverse straightedges may be used in the operation of the dock, according to the nature of the job at hand. They are mounted by means of cables and pulleys which are connected with counterweights inside the vertical straightedges; thus they are substantially balanced on the faces of the vertical straightedges for easy operation. Both the transverse and vertical straightedges are moved fore and aft in the dock to any desired transverse perpendicular plane by means of an overhead crane.

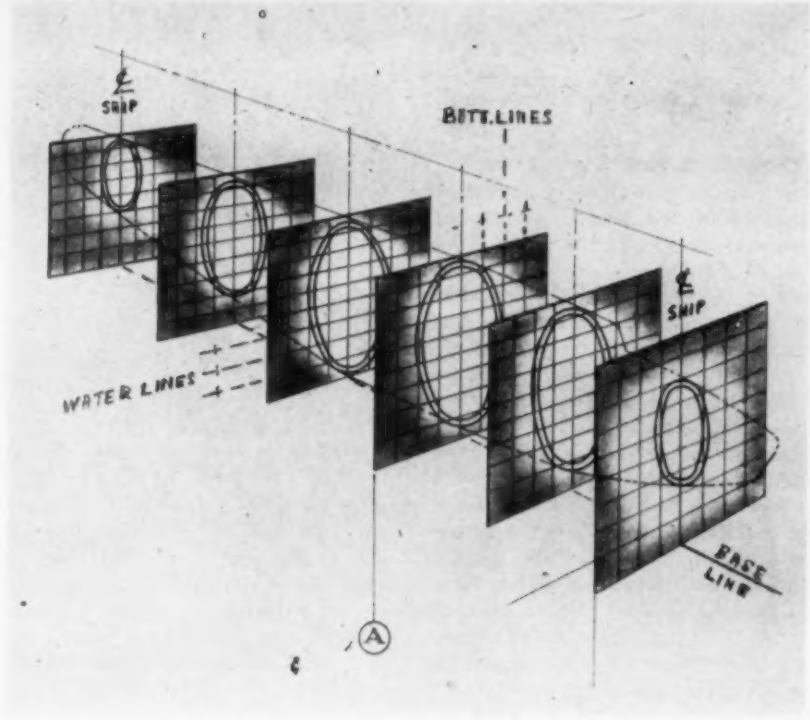
Dimensional control in the master tooling dock is established through the medium "strip templates" or location gages. Strip templates are made of three-eighths by two inch cold-rolled steel strips in the convenient length of fifty-one inches. Reamed holes, each with a diameter of .500 inch, are spaced at 10.000-inch intervals in one margin of the strip template to match the bushed holes in a straightedge, upon which the template is mounted by means of ground pins. In the opposite margin, holes are jig-bored to the precise offsets called for by the basic dimensions of the airplane.

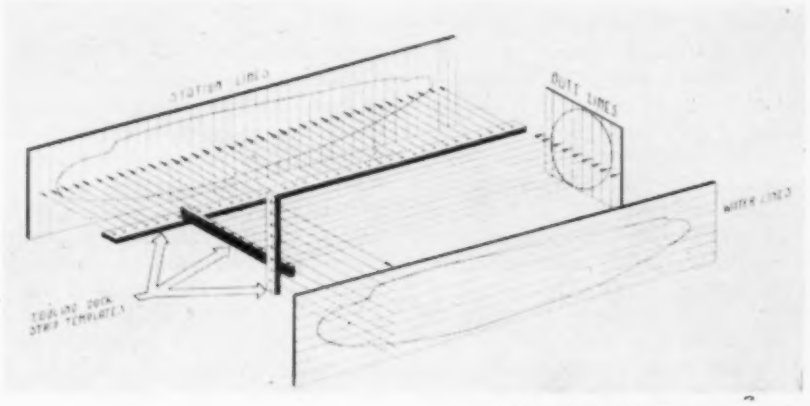
The number of strip templates required for a given airplane depends on the overall length of the ship from nose to tail, plus half its breadth from centerline to wing tip and its overall height. Stencil markings identify the templates and they may be stored in an ordinary filing cabinet.

Strip templates make it possible for tooling to begin almost at the inception of an aircraft design. They can be completed as soon as the basic station dimensions are frozen, and their entirety completes dimensional control for every point that must be established in the tooling for a given airplane. They are used repeatedly throughout the set-ups for the various assembly fixtures involved in the tooling program, and their accuracy insures the automatic co-ordination of all the fixtures produced. They are to the master tooling dock what the phonograph record is to the phonograph.

By means of strip templates, "station fittings" are positioned on the longitudinal straightedges. Ground pins, inserted in the respective station holes of the strip templates, engage the bushed holes in each station fitting, and the fitting is secured by tightening the "T" bolts which lock it to the straightedge. By using the same set of strip templates successively on each of the four longitudinal straightedges, workmen can locate station fittings accurately in each of the successive transverse planes.

The station fittings make it possible for the vertical straightedges to be accurately located in each required station plane by means of ground pins which pass through the bushed holes in each end of the height members. A screw jack at the foot of each vertical straightedge permits adjustment, so as to relieve any strain upon the longitudinal straightedge, and its position can be verified by adjusting until the locating pin turns freely in the bushed hole. A machine screw is inserted through a clearance hole in the center of each station fitting into





How the master tooling dock functions is illustrated by these drawings. Above is shown how the grid lines of the master loft are theoretically projected into the third dimension by tooling dock's straightedges. Exact dimensional control is attained through the medium of "strip templates," as indicated below.

—(Consolidated Vultee Drawings.)

threaded holes in the vertical straightedge, enabling the latter to be tightened securely against the face of the upper and lower longitudinal straightedge.

Tolerance Not Cumulative

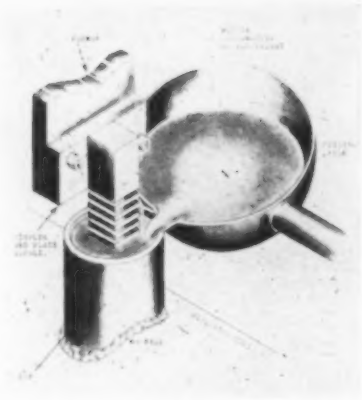
The second dimension in space is established by the level to which the transverse straightedges are set, using a pair of water-line strip templates to engage those bushed holes which represent basic dock water lines in the vertical straightedges. Ground locating pins are inserted in the offset holes of the water-line strip templates to engage the bushed holes in the ends of the transverse straightedges. The bushed holes are exactly centered with the horizontal surfaces of the transverse straightedges. When the transverse straightedges have been leveled at the desired plane and drawn flush with the face of the left-hand vertical straightedge (reference face), they are securely fastened in position by means of "T" bolts in the corresponding slots of the vertical straightedge.

The third dimension in space is established by means of a suitable fitting accurately positioned upon the transverse straightedge. The two general types of fittings that are encountered might be compared with the "mortise" and "tenon" joinings used in woodworking. The mortise is called a "female fitting," and the tenon is called a "male fitting."

A phenomena of the master tooling dock is that the tolerances, which must necessarily exist in its settings, are not cumulative. The dimensional control established by the successive use of identical cold-rolled steel strip templates tends to negate deviations in the various mating assemblies. Therefore, it has been found consistently possible to produce fixtures within machine shop tolerances.

Before work is commenced upon a fixture in the master tooling dock, it is essential that the rough fixture structure be accurately located with regard to the reference lines of the dock and secured for the setting-up operations which follow. In all cases, the loading rails are used for bolting the work securely in place. The loading rails extend down the center of the dock and comprise two pairs of steel channels, spaced so as to admit the use of "T" bolts.

Since the majority of master metal layouts (lofts) are those which portray the detail assembly of either fuselage bulkheads or wing ribs, it is a common practice to locate two or more tool holes in the primary part of each assembly layout for use during the blanking, forming, and detail assembly of individual bulkheads and ribs; thereby a direct relationship of



Locators or formers are "frozen" in position by pouring molten Cerromatrix into a pot on the jig frame.

the tool hole to the contour of the completed parts is established. To establish wing or fuselage contours in true conformity with the master loft layouts, the master tooling dock utilizes these tool holes as construction holes in assembly tooling through the medium of "index templates."

Because the grid lines of the master loft provide the basis for the co-ordination of all layouts, co-ordinating holes may be drilled in the master layout on the center line of a fuselage at the intersection of two water-line grids common to each of the layouts. These may be co-ordinated with a photo of the body plan (nested view of the contours) by matching with holes drilled in identical grid line intersections. To insure precision in drilling, an index bar may be used. The first hole is made by drilling to a center punch location; then the index drill bar is plugged into this hole and all remaining holes are drilled through the bushing of the bar while the bar is accurately aligned with the grid. The tool holes of each successive master layout may then be transferred to the index template and identified by scribed lines and arrows which indicate specific contours.

From the above, it can be understood why the index template is an intermediate template of a new character. Upon it are nested not only the contours of the body plan, but the tool or construction holes to which each is directly related. Working reproductions of the template can be produced from the master for the various framing jigs required to build an airplane in strict accordance with loft.

The index template is mounted upon a pair of transverse straightedges in the master tooling dock by means of "index fittings," and this makes it possible to move from station to station, successively establishing the positions of each bulkhead or rib locator. Tool or construction holes in each locator are matched with corresponding holes in the index template, using ground pins, and when a locator is positioned it may be securely attached to the structure of the fixture by any one of several methods — the most common of which involves the use of "jig couplers," wherein molten Cerromatrix is poured. The assembly is then drilled to receive dowels, which secure the locator to the couplers.

Framing jigs completed in this manner can be depended on to produce assemblies with those smooth and accurate contours which are so painstakingly developed in the master loft. Moreover, since the station locations of the various panel fixtures (which much mate together) are successively positioned by means of identical station strip templates, their co-ordination for splicing—each with the other—is automatic.

Important considerations in designing fixtures for dock set-ups are:

(1) The jig structure need not have machined surfaces from which the tool maker may work in establishing the position of his jig locators, since these are securely held in the dock clear of the structure. The securing of the locator to the structure is simply a uniting operation, and the manner in which this is effected may be at the discretion of the tool designer.

(2) The tool designer should remember that the dimensional controls which establish the positions of the locators on his fixture are established in the template department from master layouts and basic loft dimension; and that such arbitrary dimensions as he establishes on the tool should be primarily related to the fixture structure, all other dimensions being merely noted and referred to the loft. Also, the tool designer should call out the templates essential to the construction of his fixture and note these on the tool design drawing.

(3) The tool designer should show the essential framework of his assembly in phantom and relate the axes of his jig structure to the basic reference lines of the loft, so that the jig structure may be correctly positioned in the tooling dock during set-up operations.

Akin to Assembly Line Flow

It has been found further advantageous to prepare with each tool design a sketch showing how the fixture should be set up in the master tooling dock. On this sketch the correlation between the basic grid lines of the dock and the basic grid lines of the assembly are developed. It is optional with the tool designer whether he locates his component parts by nesting

(Continued on page 86)

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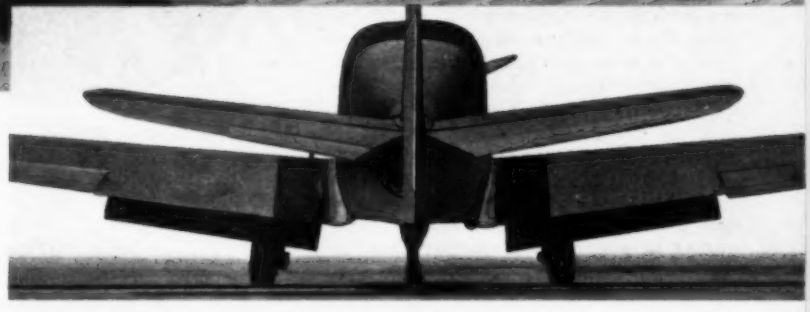

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REVVING UP

(Continued from page 20)

as, L. B. Glidden, Manager, Texas (Northern and Western parts). **Denver Region**—Boston Bldg., Denver 2, Colo., Ross L. Hudson, Manager, Colorado, New Mexico. **Detroit Region**—607 Shelby Street, Detroit 26, Mich., Arthur F. Fushman, Manager, Michigan (except upper peninsula). **Houston Region**—723 Main Street, Houston 2, Tex., W. I. Phillips, Manager, Texas (southeastern part). **Kansas City Region**—Federal Reserve Bank Bldg., Kansas City 6, Mo., Albert L. Strong, Manager, Kansas, Oklahoma. **Los Angeles Region**—Pacific Mutual Bldg., Los Angeles 14, Calif., Hector C. Haight, Manager, Arizona, Southern California. **Minneapolis Region**—McKnight Bldg., Minneapolis 1, Minn., China R. Clarke, Manager, Minnesota, Wisconsin, North Dakota, South Dakota, Michigan (upper peninsula). **New Orleans Region**—837 Gravier Street, New Orleans 12, La., George W. Robertson, Manager, Louisiana, Mississippi. **New York Region**—33 Liberty Street, New York 5, N. Y., Thomas J. Ahearn, Jr., Manager, New York, New Jersey. **Omaha Region**—Woodmen of the World Bldg., Omaha 2, Nebr., Herbert S. Daniel, Manager, Wyoming, Nebraska. **Philadelphia Region**—1528 Walnut Street, Philadelphia 2, Pa., E. Raymond Scott, Manager, Pennsylvania, Delaware. **Portland Region**—Pittock Block, Portland 5, Oregon, William Kennedy, Manager, Washington (eastern half and southwestern part), Idaho, Montana, Oregon. **Richmond Region**—Richmond Trust Bldg., 7th and Main Streets, Richmond 19, Va., W. B. Cole, Manager, Maryland, Virginia, Washington, D. C. **St. Louis Region**—407 No. 8th St., St. Louis 1, Mo., B. Glenn Gulledge, Manager, Missouri, Kentucky, Arkansas. **San Antonio Region**—Alamo National Bldg., San Antonio 5, Tex., L. C. Andrews, Manager, Texas (southern part). **San Francisco Region**—200 Bush Street, San Francisco, Calif., John S. McCullough, Jr., Manager, Nevada, Northern California. **Salt Lake City Region**—Dooly Bldg., Salt Lake City 1, Utah, Gerald L. Leaver, Manager, Utah. **Seattle Region**—Dexter Horton Bldg., Seattle, Wash., Richard M. Price, Manager, Washington (western half with exception of Clark, Cowlitz, Klickitat, Skamania, Wahkiakum Counties), Alaska.

★ ★ ★

EDUCATION FOR THE AIR AGE: Like a snowball rolling down hill, plans for expanding aviation education in our public schools are gaining momentum and new workers almost daily. However, not too much interest or help is coming from people who stand to profit from widespread aviation education, i. e., fixed-base operators, flying schools, airlines, manufacturers and model airplane companies. Educators in every state are begging for assistance and guidance. A great deal of encouragement is needed in towns and counties whose school systems have ignored aviation courses in their curricula. Few flying schools have shown a willingness to donate a private pilot course to at least one high school teacher interested in teaching aviation subjects. The resultant publicity would more than compensate for costs, not to mention the ultimate benefits and profits deriving from establishment of aviation ground courses in the local schools.

If you're looking for authoritative information and guidance on the subject, we recommend you write the California State Department of Education, Sacramento, for a copy of the Bulletin on Aviation Education in California Public Schools. In our opinion it's the most comprehensive and practical source of information available. Other states might well follow California's recommendation.

★ ★ ★

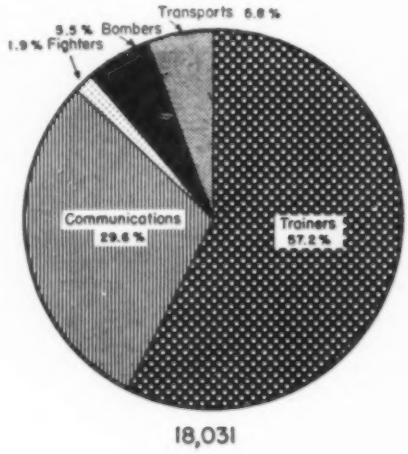
SURPLUS SALES REPORT: Herewith is an interpretative chart showing the number of planes that have become surplus, the number already sold and the number currently on hand. It was released by the War Production Board last month following relaxation of Limitation Order L-48 to permit modification and overhaul of surplus aircraft.

WPB says CAA and RFC figures show 18,031 planes have become surplus. Of these, 5,183 have been sold and those on hand total 12,848.

The surplus aircraft situation took a new turn with revelation that increasing numbers of fighters and bombers are being declared surplus in this country and abroad. To make a long story short, the SWPA says such unfit planes are getting in the way, especially those that are overseas, and are "seriously interfering with military operations." So certain classes of surplus combat planes are being salvaged and scrapped — all usable parts are reportedly removed and either returned to service or stored, usable scrap residue is either sold in local markets or stored.

"Any demand for combat aircraft or their component parts for classroom use in technical schools, or for experimental and non-aviation uses, can readily be filled from surplus stocks in the United States," said Surplus War Property Administrator W. L. Clayton. That's a pretty broad promise, and those who qualify should lose no time in applying for this valuable educational material.

To date, these planes have become surplus:

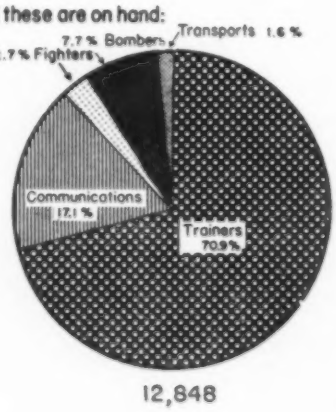


18,031

These have been sold:

5,183

And these are on hand:



12,848

Note: One Army bomber has been sold.

★ ★ ★

PHOTO JOES GET ARMS: The photo-reconnaissance pilots who fly North American's fast F-6 can carry a full complement of guns and bombs. Its cameras are installed in the fuselage near the tail, and the pilot makes both vertical and oblique shots. F-6 otherwise is regular production model of the P-51.

★ ★ ★

CAA CHANGES: William S. Moore, who until recently was with the AAF Flight Control Command, has been named chief of the CAA's General Inspection Division. He was with CAA prior to entering the AAF. . . . Glenn Woodmansee was moved up from the post of acting general counsel for CAA to succeed Webb Shadle as general counsel. Shadle resigned to resume private law practice in Los Angeles.

★ ★ ★

NEW ORGANIZATION: V. G. Landrum, secretary-treasurer, has announced organization of the United Pilots and Mechanics Association, with headquarters at 1001 Carry Building, Washington 5, D. C. He said its principal aims are promotion of adequate regulations for pilots, mechanics and technicians; establishment of proper CAB and CAA understanding of its members' problems, and to advise the government on other non-scheduled aviation matters. Officers in addition to Landrum are L. Alton Denslow, president and Cranfill Fowler, vice president.

★ ★ ★

NEW PLANES COMING: Announcements of new aircraft during the near future will probably include Fairchild's "family plane"; two fighter innovations and a completely new design by North American; considerable details on Consolidated Vultee's big B-32; an amphibian for the private flier by Allied Aviation, the glider firm; Consolidated Vultee's plans for a postwar Stinson, and a four-place Taylorcraft. ★ ★ ★

MODERN AIRPORTS

And Airport Management

DECEMBER, 1944 • VOLUME 1, NUMBER 4

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Photo courtesy Glenn L. Martin Company

TERMINAL BUILDING, MARTIN AIRPORT
MIDDLE RIVER, MARYLAND

Modern Airports

The WRONG Kind of Airport

Guest Editorial

By HART BOWMAN

Aviation Director
City of Dallas, Texas

AIR TRANSPORTATION is indeed the brightest picture in the postwar world. It would seem that almost every town is planning an airport or airpark. But let's not allow our imagination and dreams to outrun our good sense. The super-airports some of our cities and small towns are planning are built on dreams and hopes—not upon knowledge of and experience in the aviation industry.

At the many aviation conventions held this year we have heard innumerable superlatives employed to describe the super-super airports. Too few of those orators have bothered to discuss the requirements of the small airport or airpark or airstrip.

Recently, addressing a luncheon meeting in a town of about 15,000 persons, I outlined my candid estimate of their airport needs: An airport having not more than three runways, with the prevailing-wind runway paved to a maximum of 3,000 feet in length and 80 feet in width. The other two runways could be of turf. The administration buildnig should be conservative in size and facilities, with accommodations for one airline. The same accommodations could be used for feeder lines when they are established, and space should be provided for a restaurant.

My honest intention was to offer sound counsel which, if followed, would provide an adequate but not excessively expensive airport for this town, with provision for expansion when needed. The intent was recognized by the town's newspaper, which published the address in company with a feature editorial rating these recommendations as the most sensible and consistent advice yet offered on the local airport question.

Then came the deluge! I was besieged with telephone calls from interested business men of that community, demanding that I retract my estimate of their town's airport requirements. They insisted they needed an airport with four runways, paved 4,000 feet in length and 150 feet wide, and a magnificent administration building. The cost of this de luxe airport and facilities would have reached nearly half a million dollars.

Such an expenditure for this town, especially in view of its present airport requirements, would be a monument to blind foolishness—a dream of wishful thinking which could seriously damage the normal progress of postwar aviation in that area. For at this time the town does not have an airline stop, a feeder line, or a commercial operation of any kind.

Many of us, oldsters in aviation, have no difficulty in recalling the 1929 crash, when we talked and built on the prospect of millions of airplanes which of course didn't materialize. Must we go through something like that again in order to realize that over-elaborate airports bring their inevitable day of reckoning? Why can't we, this time, be sane and hardheadedly sensible, and build ports and facilities which fill today's *actual* needs, with allowance for future *expansion?*

Certainly foresight requires that we prepare for the day when some of our cities will need super-airports to handle their air traffic. Land should be purchased or options secured in preparation for such a time.

In my belief we are coming into an air age with potentialities far beyond our dreams. Air supremacy is here, in both quality and quantity. Vast advancement in aviation is well under way.

But we stand to lose much that we are gaining just because so many communities have been oversold on their airport needs. Even though a modest airpark would fill the bill for them for ten years to come, their pride rebels at the idea of an unpretentious field and building. They visualize a modernistic terminal building—long runways of smooth cement—a swank restaurant—and dozens of gaily painted personal planes brightening the taxi strips and sky. They overlook the dire possibility of financial tragedy if that elaborate business institution cannot operate profitably on the limited amount of air business available in the local area.

Pride is a great thing; it has played an important role in many Americans' success. But don't for a minute forget that it has also ruined many individuals when the cards didn't fall right. Many a town, impelled by pride to build the kind of airport it doesn't need, will be paying the price for many years to come. Don't let your town head that way. A commonsense program, supported by men whose opinions carry weight locally, can keep it on the beam! ★ ★ ★

The National Airport Plan

Sweeping proposals for aviation expansion during the next ten years have been presented to Congress. Here's a review of the billion-dollar course charted by CAA.

LONG awaited details of Civil Aeronautics Administration's new National Airport Plan came out late in November with its presentation to Congress, with the CAA requesting construction of 3,050 new airports and improvements to 1,625 of the nation's 3,000 existing airports over a five to ten year period at a total cost of approximately $1,250,000,000.

Voluminous in content, the national program was prepared at the request of the House of Representatives, and represents many months of intensive research and study by the Civil Aeronautics Administration. Facts and figures were meticulously broken down into the smallest details, despite the immensity of the undertaking, and the program represents the most comprehensive analysis of postwar aviation prospects yet to appear. The report to Congress predicted 6,000,000 prospective fliers, 350,000 Army and Navy pilots and 150,000 civilian pilots and students at war's end, and 400,000 civil airplanes within ten years following the Armistice.

Federal-State participation is the keynote, with the states matching Federal allotments, which would be authorized by adoption of Congressman Jennings Randolph's (Dem.-W. Va.) H. R. 5024, already presented to Congress and proposing a billion-dollar enabling appropriation together with a mathematical formula determining the state allotments by population, area, existing airports, and number of airplanes.

$3,000,000 Sought Immediately

The CAA's plan recommended:

"1. That Congress authorize an appropriation to the Office of the Administrator of Civil Aeronautics not to exceed $100,000,000 annually to be used in a program of Federal aid to public agencies for the development of a nationwide system of public airports adequate to meet the present and immediate future needs of civil aeronautics.

"The Administrator be authorized to allocate such funds for any construction work involved in constructing, improving, or repairing (as distinguished from day-to-day maintenance of) an airport, including the construction, alteration and repair of airport buildings other than hangars, and the removal, lowering, marking and lighting of airport obstructions; for the acquisition of any lands or property interests necessary either for any such construction or to protect airport approaches; for making specifications, supervising and inspecting construction work; and for field surveys, preparing plans and any necessary Federal expenses in the administration of this program.

"2. That Congress appropriate to the Civil Aeronautics Administration three million dollars to be available

NATIONAL AIRPORT PLAN BY STATES

STATE	Existing Airports*	Existing Airports To Be Improved	Proposed New Airports	Total Airports at Completion Program*	Proposed Costs
Alabama	75	27	35	110	$ 12,185,000
Arizona	78	15	44	122	10,935,140
Arkansas	45	25	65	110	35,109,634
California	251	137	174	425	56,912,500
Colorado	53	31	36	89	12,178,000
Connecticut	22	11	26	48	16,350,000
Delaware	13	7	11	24	2,684,000
District of Columbia	3			3	
Florida	192	48	57	249	23,734,630
Georgia	68	17	50	118	9,310,000
Idaho	51	28	23	74	9,085,000
Illinois	87	55	105	192	40,076,000
Indiana	56	28	68	124	16,032,000
Iowa	50	28	80	130	9,951,500
Kansas	76	42	76	152	7,732,000
Kentucky	28	14	76	104	7,865,000
Louisiana	50	35	63	113	40,617,890
Maine	30	24	43	73	19,565,000
Maryland	26	7	64	90	14,065,000
Massachusetts	55	26	35	90	29,931,000
Michigan	121	80	92	213	22,813,000
Minnesota	45	36	114	159	11,736,000
Mississippi	60	22	51	111	10,790,000
Missouri	58	32	71	129	18,923,000
Montana	77	52	24	101	10,473,100
Nebraska	57	37	54	111	8,824,000
Nevada	43	24	30	73	4,752,100
New Hampshire	16	14	25	41	14,934,000
New Jersey	50	24	59	109	31,968,780
New Mexico	69	28	52	121	33,016,594
New York	129	60	122	251	58,590,895
North Carolina	67	34	55	122	19,776,000
North Dakota	32	18	55	87	3,842,000
Ohio	104	77	129	233	31,161,000
Oklahoma	95	43	89	184	37,300,440
Oregon	50	22	33	83	6,579,000
Pennsylvania	140	76	131	271	46,667,000
Rhode Island	8	7	11	19	5,069,000
South Carolina	48	12	40	88	12,839,000
South Dakota	29	14	26	55	4,730,500
Tennessee	32	20	55	87	13,142,000
Texas	319	123	213	532	120,923,152
Utah	33	19	54	87	12,120,790
Vermont	12	10	25	37	12,867,000
Virgina	63	30	103	166	23,239,000
Washington	76	37	42	118	20,158,000
West Virginia	24	12	73	97	28,649,000
Wisconsin	48	33	81	129	17,944,000
Wyoming	41	24	10	51	3,472,000
Total	3255*	1625	3050	6305*	$1,021,567,945

*Includes airports under construction by agencies other than CAA.

CAA regions and the states comprising them are as follows: Region 1—Maine, New Hampshire, Vermont, Massachusetts, Connecticut, New York, Pennsylvania, New Jersey, Delaware, West Virginia, Virginia, District of Columbia, Rhode Island, Maryland; Region 2—Tennessee, North Carolina, South Carolina, Georgia, Alabama, Mississippi, Florida; Region 3—Minnesota, Wisconsin, Illinois, Michigan, Indiana, Ohio, Kentucky, North Dakota; Region 4—New Mexico, Oklahoma, Texas, Arkansas, Louisiana; Region 5—Wyoming, South Dakota, Nebraska, Iowa, Colorado, Kansas, Missouri; Region 6—California, Nevada, Utah, Arizona; Region 7—Washington, Idaho, Oregon, Montana.

immediately for further preparatory work in order that an adequate airport construction program may commence immediately after appropriation for construction is enacted.

"3. That such a program be conducted in co-operation with the states and other non-Federal public agencies on a basis to be determined by the Congress. That the Federal contribution be determined by the Congress in passing the necessary enabling legislation. A good precedent for the proportionate sharing of costs exists in the Public Roads program which has operated satisfactorily for years on a fifty-fifty basis.

"4. That any project for which Federal aid is requested must meet with the approval of the Administrator of Civil Aeronautics as to scope of development and cost, conform to CAA standards for location, layout, grading, drainage, paving, and lighting, and all work thereon be subject to the inspection and approval of the Administrator of Civil Aeronautics and his designated representatives.

Participating Requirements

"5. In order to participate in the Federal aid program, a state shall

"(a) Establish and empower an official or an official body equipped to conduct its share of the program.

"(b) Have legislation adequate for the clearing and protection of airport approaches, and such other legislation as may be necessary to vest in its political subdivisions all powers necessary to enable them to participate through the state as sponsors of airport projects.

"(c) Have no special tax on aviation facilities, fuel, operations, or businesses the proceeds of which are not used entirely for aviation purposes.

"(d) Insure the operation of all public airports within its jurisdiction in the public interest, without unjust discrimination or unreasonable charges.

"(e) Insure the proper operation and maintenance of all public airports within its jurisdiction.

"(f) Make airports developed with Federal aid available for unrestricted use by U. S. government aircraft without charge other than an amount sufficient to cover the cost of repairing damage done by such aircraft.

"(g) Require the installation at all airports for which Federal funds have been provided of a standard accounting and fiscal reporting system satisfactory to the Administrator.

"6. That sponsors of projects be required to enter into contracts with the Civil Aeronautics Administration insuring the proper maintenance and protection of airports developed with Federal aid and their operation in the public interest."

Public Works Program

During recent months Washington reports have speculated over possibilities of the Roosevelt administration using the National Airport Program to bulwark its latest New Deal planning. In this regard it is interesting to note the CAA's interpretation of airports as Federal Public Works. "A national airport system is so essential that it cannot be laid away on a 'shelf' of public works plans for use only in a period of widespread unemployment," the CAA stated, adding: Actual construction would provide approximately 1,250,000 man-months of temporary employment and on completion the national airport system would furnish continuous employment, on a basis of ten employes per airport, to some 63,000 persons; the proposed airports are potential military bases and training facilities for a reserve of civilian fliers and thus would bulwark our air power; new Federal funds would be attracted immediately for hangar construction and other needed commercial facilities as well as aircraft maintenance and sales, services, flying schools, restaurants, and many other aeronautical or non-aeronautical enterprises; improved terminal airports, by eliminating costly congestion and by providing longer runways for increased payloads, would prove an important factor in reducing the cost of air transportation and thus pay for themselves in the long run. The agency explained further that the annual cost of the proposed construction, if accomplished in a 5-year period, would amount to less than 3 per cent of the normal annual dollar volume of all construction activities by public and private interests (10-11 billion a year 1925-1929). "With an adequate National Airport Program civil aviation can grow to a point where it becomes a substantial segment of the nation's economy and sources of employment," the CAA commented.

The CAA explained to Congress that its plan is temporary and will require revisions from time to time to adjust it to current needs as aviation develops in the postwar period. Population was used as the primary basis of airport distribution, the CAA contending that the need for airports is directly related to population and area. The suggested class of the various airports was determined by the relative importance of the locality as the center of a trading area, its function in the nation's airport system, and its importance to existing and proposed air routes. In areas of high population density airports were located to render maximum utility with a minimum number.

Cost Breakdown

Total cost of the construction proposed in the plan was estimated at $1,021,567,945. This does not include the cost of land or buildings, which may vary greatly depending on the exact sites selected. Expenditures may be divided into five general classifications:

1. Preparations of the site—Clearing, grubbing, excavation and grading, drainage, surface conditioning, and fencing, estimated to cost $525,304,322, or 51.4 per cent of the total cost.

2. Paving — Runways, taxiways, aprons. Estimated cost of this item is $395,305,460 or 38.7 per cent of the total. This compared with 46 per cent for paving in the Defense Airport Program where there was greater emphasis on large airports with paved runways.

3. Lighting — Installations and equipment costs for Beacon, Boundary, Obstruction, range, runway and taxiway flood or contact lights, and wind tee or tethahedron. Estimated cost, $55,081,978, or 5.4 per cent.

4. Radio—Cost of equipment and installation of necessary facilities. Estimated at $10,983,000, or 1.1 per cent.

5. Miscellaneous — Includes approach clearing, access roads, marking and landscaping. Estimate, $34,893,185, or 3.4 per cent.

Airports intended only for private flying would get 39 per cent of the proposed outlay. Improvement or construction aimed at making possible extension of airline service, and in most cases simultaneously improving facilities for personal flying, accounts for 50.8 per cent of the expenditures, while cost of work at presently designated air carrier stops would amount to 10.2 per cent. The cost for airports which would permit extension of air service to additional communities is about evenly divided between the places named in pending applications for certificates and those which might subsequently be considered.

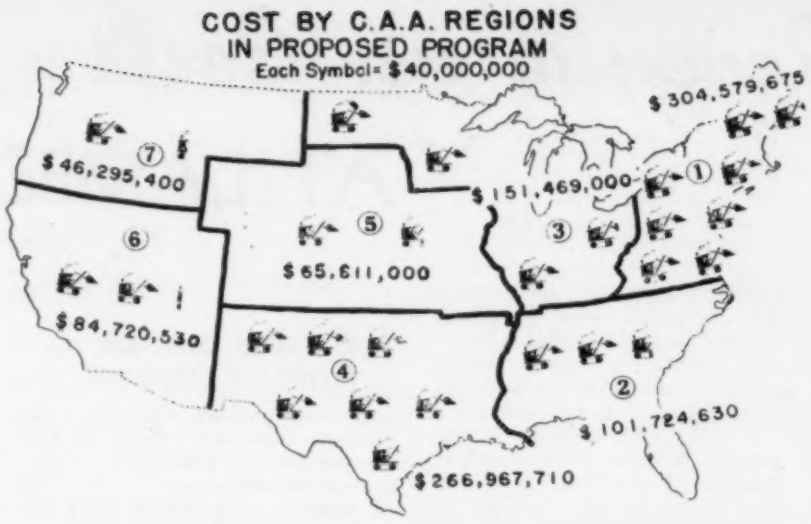
Expenditures for new airport facilities would be 58 per cent of the total, while 42 per cent would go to improvement of existing airports.

Approximately 17 per cent of the funds would be spent in communities of 50,000 or more, and the remaining 83 per cent in communities of less than 50,000 population. It is possible, however, that as metropolitan districts complete comprehensive plans, the ratio will be altered.

Class 1 airports would cost 15.2 per cent of the total; Class 2, 45.4 per cent; Class 3, 22.3 per cent; Class 4, 10.7 per cent, and Classes 5 and 6, 4 per cent.

The CAA program recommended that as a condition for receiving Federal aid, the states and their political subdivisions "shall enact zoning laws adequate to restrict the height to which structures and objects of natural growth may be erected or allowed to grow in the vicinity of airports." It also recommended that Federal aid for airport development include the cost of approach clearing and protection in the construction costs for which Federal funds are available.

Pointing out deficiencies of the existing airport system, the CAA said large cities now offer too few landing areas, inconveniently located in relation to the population — there are 438,585 persons per airport in cities of more than 500,000. Applications to bring air service to 678 communities not now receiving it are on file. Among the 286 places (101 are temporarily suspended mostly because planes are not available to the airlines) now approved for air carrier service, there are 140 which do not meet the desirable minimum of 5,000-foot paved runways, and many have inadequate taxiways, parking and servicing aprons, insufficient number of runways for normal variation of winds, and obstructed approaches. Towns of less than 25,000 population show the greatest lack of airport facilities. While the 412 urban places with populations above 25,000 have 602 airports, only 2,340 of the 6,257 towns with 1,000 to 25,000 population have any airport. Existing airports are so distributed that only 1,635, or 53 per cent, of the 3,076 counties in the United States have one or more landing areas. The 140 metropolitan districts, covering 1.5 per cent of the land area of the nation, average one airport for every eighty square miles, while in the remainder of the country there is only one airport for every 1,230 square miles. "It is axiomatic," said the CAA, "that every new airport increases the utility of every existing airport."



Maps on these facing pages show how CAA regions compare in distribution of airports, improvements and costs. Leader is Region 1, with 1,319 projects costing $304,579,675. Region 4 is second in costs with $266,967,710 but third in number of projects, 1,060, while Region 3 is third in costs with $151,469,000 and second in number of projects with 1,241. Fourth is Region 2 with 885 projects and $101,724,630, fifth is Region 6 with 707 projects and $84,720,530. Sixth is Region 5 with 717 projects and $65,611,000 and seventh is Region 7 with 376 projects and $46,295,400.

6,000,000 Prospective Fliers

While existing needs for airports are substantial, the CAA estimates future needs to be tremendous. In sharp contrast to the approximately 25,000 civilian aircraft said by the CAA to be on hand now, it expects 400,000 civil airplanes to be operating within ten years after the war's end. At the end of the war the United States will have about 350,000 military pilots and 150,000 civilian pilots and students. Also interested in flying will be 2,500,000 men trained by the armed forces in other aviation skills and an almost equal number employed in our aviation factories. "Add to these the 250,000 students who are taking aeronautical courses in the high schools each year, and there is a total of 6,000,000 prospective fliers," the CAA told Congress.

If only one out of four takes up flying as a vocation or avocation, there would be 1,500,000 airport users, plus millions of prospective airline travelers. This calls for airports near the potential fliers' homes or places of business and near the recreational areas, national parks, and other places to which they might want to fly. The majority of small airports today were located from the standpoint of low development cost rather than convenience.

"The sale of personal aircraft offers the brightest hope for a mass market, which will maintain even a reasonable fraction of our present twenty-billion-dollar-a-year aircraft manufacturing industry," said the CAA. "Preserving a nucleus of this industry is important both to defense and the national economy, for it can provide a substantial source of employment in peace and the weapons of war should we ever need them in a hurry.

"The contribution which airports for personal flying can make toward this goal and toward training civilian pilots as a reserve of air power invests them with national interest. That is why this plan calls for 2,900 of the 3,050 airports in the categories especially suitable for personal flying." ★ ★ ★

Additional Details Coming

Further analysis of the CAA's far-reaching National Airport Plan will be published in these columns next month to supplement the foregoing review of the Plan's outstanding provisions.

Revenue vs. Costs AT LAMBERT ST. LOUIS

WITH $10,000,000.00 to spend on postwar improvements, Lambert St. Louis Municipal Airport is taking inventory of itself. During the fiscal year ending March 31, 1944, the airport showed a net operating profit of $27,088.87 without taking into account interest on investment or retirement of principal.

Largest share of the revenue is contributed by the three aircraft manufacturers whose plants are on airport property. In this respect the St. Louis airport joins a select few that gain appreciable revenue from such a source. Without this income the St. Louis profit would have been only about $4,000.

Second principal source is the airlines whose contribution is nearly always substantial at an airport which they use. Discounting the mail and express activity produced by St. Louis as a city, the airline payments would figure out to be about 20 cents per passenger originating or destined at St. Louis.

One-third of the total revenue, and only $1,000 smaller contributor than the airlines, are the airport restaurant and other concessions. Fixed-base operators turn in an appreciable amount to the revenue figure.

It is interesting to note that farm privileges on the airport fringes netted the airport approximately $1,800.00.

Statistical fact of interest is the total of 404,427 arrivals and departures during the year. Gasoline dispensed to these aircraft totaled six and a third million gallons, principally to military planes.

Chief objection to the revenue total as expressed by John E. Randolph, airport manager, concerned the government offices that pay only a dollar a year plus utilities. One entire wing of the second floor of the terminal building is so leased to government offices occupying a space equivalent to that returning nearly $3,000 a year from commercial sources.

Army and Navy, which produce most of the transient business pay nothing for the use of the field.

The figures for Lambert follow:

AIRPORT CHARGES

Landing Fees	
One daily schedule per month	$100.00
Second daily schedule	50.00
Additional daily schedules, each	25.00
All other charges on contract basis.	

Exclusive Gas, Oil Privileges Opposed

Last month's National Aviation Clinic at Oklahoma City unanimously approved a resolution introduced by Dudley Steele, manager of Lockheed Air Terminal, Burbank, Calif., opposing sales of exclusive vending privileges for aviation petroleum products at public airports except in the case of airports with small consumption, where it may be uneconomical for more than one brand of aviation petroleum products to be handled.

The resolution cited an "alarming tendency toward the sale of exclusive vending privileges of aviation petroleum products on public airports" and warned that "monopoly increases costs to the detriment of the consumer interest." In the case of small airports, the resolution recognized that such concessions "may be consonant with the public interest through actual cost reductions and may therefore be permitted so long as they do not apply to airlines or government aircraft.

YEARLY EXPENSES (1943-4)

Personal Services		$27,390.42
Supplies		
Office	$ 74.52	
Telephone	319.50	
Cleaning and Sanitary	79.05	
Miscellaneous	2,896.37	
Lubricants	69.11	
Auto Supplies	98.03	
		3,536.58
Contractual		
Fuel	$1,956.55	
Electricity	4,423.84	
		6,380.39
Maintenance		
Structures	$1,340.44	
Small equipment	532.61	
Main equipment	168.74	
Machinery and Apparatus	50.00	
		2,091.79
Rock and Emulsion for field		$ 4,656.56
		$43,888.93

WHO PAYS AT LAMBERT—ST. LOUIS? (1943-4)

Airlines—	
American Airlines: Rent, $1,550.04; Landing fees, $2,400.00; Ticket Office, $750.00	$ 4,700.04
Chicago and Southern Air Lines: Rent, $1,200.00; Landing Fees, $3,350.00; Ticket Office, $399.96	4,949.96
Eastern Air Lines: Rent, $150.00; No Landing Fees; Ticket Office, $199.98	349.98
Mid-Continent Airlines: Rent, $300.00; Landing Fees, $1,325.00; Ticket Office, $366.63	1,991.63
TWA: Rent, $1,200.00; Landing Fees, $3,600.00; Ticket Office, $750.00	5,550.00
	$17,531.61
Concessions—	
Restaurant, $13,234.48; Barber Shop, $300.00; Pay Telephones, $1,044.82; Pay Toilets, $815.03; Other, $240.00	15,634.33
Fixed Base Operators—	
Brayton Flying Service, $6,825.00; St. Louis Flying Service, $600.00; Oscar Parks, $240.00	7,665.00
Manufacturers—	
Curtiss-Wright Corporation, $3,279.00; Robertson Aircraft Co., $7,104.90; McDonnell Aircraft Co. $12,569.93	22,953.83
Government Agencies—	
CAA, $3,010.14; Post Office, $600.00; U. S. Engineers, $437.21; Weather Bureau, $450.00	4,497.35
Miscellaneous	3,301.99
	$71,584.11

★ ★ ★

Gasoline Storage Facilities Listed

Of 3,265 airports, including Army and Navy, in the U. S., only 1,853 have gasoline storage facilities. Of these, 134 have storage facilities of less than 500 gallons, 382 store 500 to 1,000 gallons, 360 store 1,000 to 2,000 gallons, 181 store 2,000 to 3,000 gallons, 128 store 3,000 to 5,000 gallons, 90 store 5,000 to 10,000 gallons, 160 store 10,000 to 50,000 gallons, 112 store 50,000 to 100,000 gallons, and 306 store over 100,000 gallons.

How's Your Revenue Dollar?

Announcing a contest for airport managers interested in raising their airport revenue — with $200 offered in cash awards.

By DUDLEY M. STEELE

TO stimulate interest among airport managers in profitable merchandising methods, MODERN AIRPORTS will conduct a contest, offering $200 in cash prizes for the best ideas on "Merchandising Your Airport." The contest will be divided into two sections; one for airports in cities of 200,000 population or less, and the other for airports in cities of over 200,000 population. Prizes for each of the two sections will be $50 for first place, $35 for second place, and $15 for third place.

The contest opens December 15th and the closing date will be May 1st, 1945.

The writer has spent considerable time at airport conventions and aviation clinics, urging and arguing the merits of airport merchandising. Many airport managers and city planners from all over the country have written me letters and visited my office at Lockheed Air Terminal in Burbank to obtain facts and figures about airport merchandising. This contest will serve the purpose of spreading still further the growing interest in airport merchandising. Airport managers taking part will help others because we will publish as many of the entries as possible in addition to the winning ones.

The contest centers around "the airport revenue dollar." This, as illustrated on this page by an airport revenue dollar containing hypothetical percentages, is a drawn circle in which revenue percentages are "sliced" to make a "pie," each slice representing the part of the total revenue dollar received from various sources of revenue. This eliminates the necessity of citing actual figures. Some airport managers consider their figures confidential and are reluctant to discuss them with others, but by using the "pie" system, merchandising methods can be discussed at length without giving away the actual figures.

Each airport manager uses certain methods to obtain revenue. This revenue comes from different sources — from airlines, sale of aviation gasoline and oil, hangar rent, space rental, concessions, restaurants, coffee shops, news stands and gift counters, Western Union, telephone, barber shops and the like. To determine your airport's revenue dollar, go over your figures for the year 1944. The accompanying drawing shows hypothetical percentages and the way we arrived at its "slices" is illustrated as follows: The total revenue is $50,000. It is made up of ten slices, each representing a percentage of the total. The No. 1 slice is the largest and is 40 per cent of the total, or $20,000, which is the revenue derived from airlines serving the hypothetical airport. The next largest slice is No. 2, representing gas and oil sales, which total $12,000 or 24 per cent of the total. Then we have two slices of equal size: No. 3 is for restaurants ($5,000) and No. 4 is hangar rentals ($5,000), or 10 per cent of the total for each. Space rentals totaled $3,000 or 6 per cent, newsstand revenue $2,000 or 4 per cent; barber shop $1,500 or 3 per cent and $500 each for Western Union, telephone and electricity sales — for 1 per cent each.

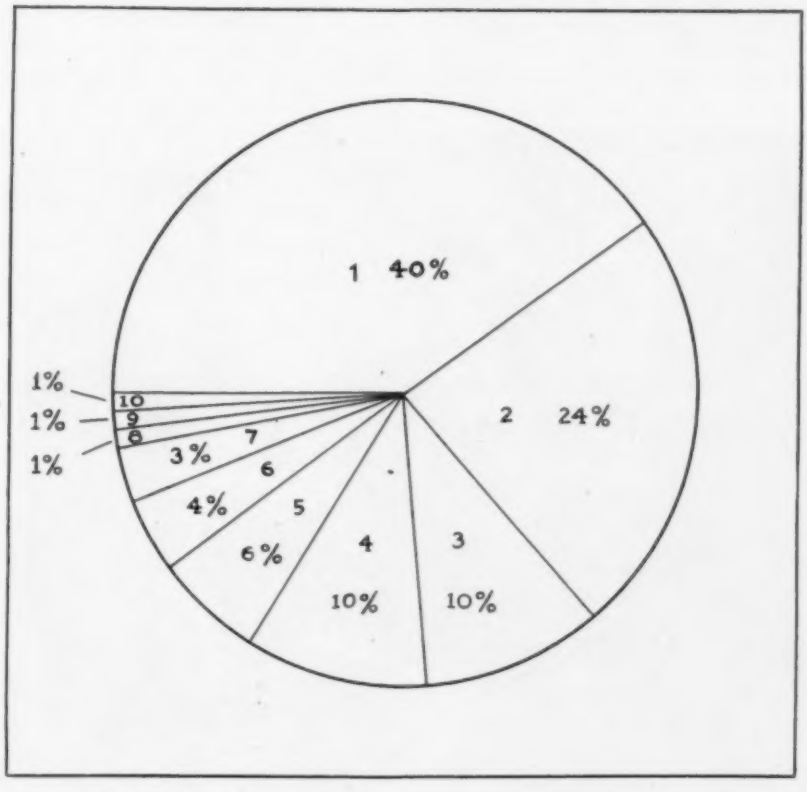
In making up your revenue dollar be sure the percentages total 100. This is a very simple operation and one that each airport manager can make without too much trouble. The difficulty with most airport surveys in the past has been the amount of special auditing and bookkeeping studies imposed on some of the small airports, many of which do not go in for thorough bookkeeping.

Easy to Participate

The rules for our contest are simple. As soon as possible after January 1st, get your figures together for the calendar year of 1944. Draw up your revenue dollar, breaking it down as shown and explained here and address it to Dudley M. Steele, MODERN AIRPORTS, P. O. Box 750, Dallas 1, Texas. We will publish as many entries as possible. At the same time stories will be written concerning them which will give airport managers some new ideas in merchandising. The name of the airport manager, the airport, and its address

(Continued on page 65)

Sample Airport Revenue Dollar



1. Airlines, $20,000.
2. Gasoline and Oil, $12,000.
3. Restaurant, $5,000.
4. Hangar Rentals, $5,000.
5. Space Rentals, $3,000.
6. Newstand, cigar counter, gift counter, $2,000.
7. Barber Shop, $1,500.
8. Western Union, $500.
9. Telephones $500.
10. Electricity, $500.

State Officials Drive for Uniform Legislation

Local co-ordination with Federal regulations features proposed codes completed at Oklahoma City work sessions. Campaign in legislatures will seek early adoption.

By MILTON F. BALDWIN

TWO recommended state codes — one covering general aviation, the other on airports— were unanimously approved by the National Association of State Aviation Officials holding annual session November 13 and 14 at the Skirvin Hotel, Oklahoma City. Working steadily in committee meetings and general sessions without the fanfare accorded the National Aviation Clinic which opened there November 15, the state officials took action which should greatly influence the future progress of aviation.

Sheldon B. (Buck) Steers, the Michigan Board of Aeronautics' able director, was elected N.A.S.A.O. president at the business session. Other officers chosen are: First vice president, Arthur H. Tully, Jr., director of Massachusetts Aeronautics Commission; second vice president, Joseph Bergin, Utah State Aeronautics Commission; third vice president, L. L. Schroeder, Minnesota's aeronautics commissioner; secretary-treasurer (re-elected), E. W. Stanford, director, Alabama Aviation Commission. These officers constitute the board of directors.

The board appointed seven regional directors: William L. Anderson, Pennsylvania aeronautics director; Lt. Col. Allen Perkinson, director, Virginia State Corporation Commission; George C. Roberts, Illinois Aeronautics Commission secretary; Major John Moodie, executive secretary, South Dakota Aeronautics Commission; Eugene V. Fryhoff, Missouri's Aviation Division director; Joseph Bergin, Utah; Major Leo G. Devaney, Oregon's aeronautics director.

Uniform State Legislation Approved

The association's legislation committee, headed by Les Schroeder, had spent many days developing the recommended bills to the point where their many features could be discussed and final form approved by the membership in open session. As a practical step toward removing inaccuracies of phraseology which might permit the bills to be invalidated, each bill was read aloud item by item at the meeting by William Green, assistant attorney general of Minnesota, and desired changes of wording were made.

Attending the Oklahoma City meeting were representatives of the Council of State Governments, the CAA, the CAB, and the Federal-State Division of the Department of Justice, who participated freely in discussion of recommended legislation. The bills will also be considered by the Governors' Conference and the National Convention of Attorneys General.

The State Aeronautic Department Bill, suggested for passage by states now having inadequate aviation laws or none at all, comprises sixteen sections. The bill defines its objectives; establishes an aeronautics commission; prescribes the commission's responsibilities and duties; outlines procedure for accepting federal aid; provides for acquisition and operation of state airports, and defines the legal status of aeronautics functions.

The Revised Uniform Airports Bill, recommended for states needing proper control of this vital phase of aviation, is made up of eighteen sections. It authorizes municipalities to acquire airports; declares airports to be a public purpose; exempts airport property and income from taxation; covers appropriation and use of funds; specifies powers of municipalities operating airports; authorizes acceptance of federal aid; prescribes jurisdiction and separability, etc.

Copies of Bills Available

The two codes are not intended to be used verbatim by any state, for they are based upon what seem to be the best features of existing aviation laws in a large number of states. However, any state wishing to enact a law on either of these two subjects can take the recommended bill, change whatever features do not fit into that state's particular picture, and thereby develop a law which will probably serve its needs better than one which the state's lawmakers, many of them totally uniformed on aviation matters, might produce. The two suggested bills have been printed in complete form, and any state official or legislator interested may secure a copy by

NASAO BILL-DRAFTING was in full sway when this picture was taken at Oklahoma City. Michigan's Buck Steers, NASAO president, seated at right, was presiding, while William Green, Minnesota attorney (seated left), analyzed each paragraph of the recommended legislation for delegates' discussion. Standing left to right are E. W. Stanford, Alabama, re-elected secretary-treasurer, and George C. Roberts, Illinois, an NASAO regional director. (Daily Oklahoman Photo.)

CAA AIRPORT SPECIALISTS assembled in Washington recently for conferences on future U. S. airport development, providing the cameraman an unusual opportunity to make this group photo. Standing left to right: J. B. Bayard, Jr., Chief, Planning and Survey division, Airport Service, Washington; H. Harvie Perkins, Supervisor of Airports, Region 2, Atlanta, Ga.; John M. Hunter, Jr., Chief, Contracts and Legislation Unit, Airport Service, Washington; Edgar Smith, Urban Planning Consultant, Airport Service, Washington; S. E. Travis, Jr. Supervisor of Airports, Region 4, Ft. Worth, Texas; Herbert H. Howell, Supervisor of Airports, Region 5, Kansas City, Mo.; A. H. Wessel, Supervisor of Airports, Region 1, New York City; Leslie C. Vipond, Assistant Chief, Airport Lighting Unit, Airport Service, Washington; Harold E. Horner, Supervisor of Airports, Region 3, Chicago; Paul Stafford, Senior Airport Engineer, Airport Service, Washington; Joseph Yarrow, Turf Engineer, Airport Service, Washington; C. Raymond Seybold, Chief, Airport Lighting Unit, Airport Service, Washington; Kenneth S. Perry, Chief, Project Review Unit, Airport Service, Washington; George R. Borsari, Airport Liaison Officer, Airport Service, Washington. Seated, left to right: George Burgess, Assistant to Assistant Secretary of Commerce, Washington; Phillips Moore, Chief, Engineering and Construction Division, Airport Service, Washington; Charles B. Donaldson, Director of Airports, Washington; R. W. F. Schmidt, Supervisor of Airports, Region 6, Santa Monica, California; Lane W. Wilcox, Supervisor of Airports, Region 7, Seattle, Washington.

addressing E. W. Stanford, director, State Aviation Commission, Montgomery 5, Alabama.

Thirty states, or nearly two-thirds of the total forty-eight, now belong to the National Association of State Aviation Officials and participate in its constructive programs. Member states are: Alabama, Colorado, Connecticut, Georgia, Idaho, Illinois, Iowa, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, New Jersey, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Utah, Vermont, Virginia, West Virginia, Wyoming.

The eleven non-member states, including seven which maintain no state aviation authority or study group so far as is known, are: Arizona, Arkansas, California, Delaware, Florida, Indiana, Kansas, Mississippi, Montana, Nevada, New Mexico, New York, North Carolina, North Dakota, Oklahoma, Texas, Washington, Wisconsin.

Resolutions

Some important resolutions were passed by the NASAO in general session. Independent aviation committees for both houses of Congress were strongly recommended, with a similar recommendation for state legislature. The state officials urged that federal radio equipment inspection be made a part of the aircraft airworthiness inspection, thus eliminating a separate inspection which often involves considerable travel expense.

One resolution focused attention upon the time lapse between filing of violation reports and the CAB's final action, and asked that this "detrimental" condition be corrected. Provision for a separate CAB division to administer the affairs of non-scheduled aviation was requested. The final resolution urged that Congress delete from Senate Bill 2105 and HR 4915 the section authorizing the Public Roads Administration to develop, construct, and maintain flightstrips adjacent to highways, as this would duplicate the functions of an existing federal aviation agency.

The annual meeting of the NASAO was far less glamorous than the National Aviation Clinic which immediately followed it. Members worked hard throughout each day on a tedious though vital project, and the final meeting began Tuesday evening and did not terminate until 3 a. m. But the Association achieved two outstanding successes: It completed a sound and much-needed legislative project, and lifted to a new high this industry's respect for state aviation commissions and their administrators.

Those present included: R. R. Adams, Louisiana director of aeronautics; Chester Allen, Wisconsin Aero Advisory Board; W. L. Anderson, Pennsylvania Aeronautics Commission; Ernest L. Bailey, West Virginia State Board of Aeronautics; Ralph E. Benson, Iowa Aeronautics Commission; G. Stewart Campbell, New Hampshire Aeronautics Commission; Adrian A. Cote, Maine Aeronautics Commission; Leo G. Devaney, director, Oregon State Board of Aeronautics.

Irwin R. Erickson, assistant attorney general, South Dakota; Major Willard M. Fletcher, Air Corps; Edward A. Forbes, Florida; Eugene V. Fryhoff, head Aviation Development, Missouri; Joseph T. Geuting, Jr., vice president, General Aircraft Corporation; William Green, assistant attorney general, Minnesota; Col. Dan F. Hunter, Iowa Aeronautics Commission; H. N. Jessen, Nebraska Aeronautics Commission; Lt. Col. Don C. Johnston, Iowa Aeronautics Association; Arthur A. Kelly, Oklahoma; Edward F. Knapp, Vermont aeronautics inspector; Douglas Langstaff, New Orleans Aviation Board; Robert H. McIntyre, Governors' Commission on Aviation, Indiana.

E. F. Markwood, Jr., South Carolina Aeronautics Commission; Dexter C. Martin, South Carolina aeronautics director and retiring NASAO president; John Moodie, South Dakota Aeronautics Commission; B. Allston Moore, South Carolina Aeronautics Commission; John E. P. Morgan, Personal Aircraft Council, Washington, D. C.; J. Valmore Normandin, Rhode Island Department of Public Works; Guy C. Richardson, Iowa Aeronautics Commission.

K. H. Ringrose, Connecticut Department of Aeronautics; George C. Roberts, Illinois Aeronautics Commission; George B. Robinson, New York State Commerce Department; M. F. Schnibben, South Carolina Aeronautics Commission; L. L. Schroeder, Minnesota aeronautics commissioner; C. R. Seybold, CAA airport lighting engineer; C. M. Sharrar, Nebraska Aeronautics Commission; Lyman W. Sherwood, Illinois Aeronautics Commission.

E. W. Stanford, Alabama Aviation Commission; Sheldon B. Steers, Michigan State Board of Aeronautics; Hubert H. Stark, West Virginia Board of Aeronautics; Arthur H. Tully, Jr., Massachusetts Aeronautics Commission; Thomas E. Walsh, Michigan State Board of Aeronautics. ★ ★

Modern Airports

THE AIRPORT and Airline Passengers

Facilities in keeping with top-notch airline service are needed for air travelers. Airports are sales counters for commercial air transportation industry.

By JOHN H. FREDERICK

EVERY airport whether large or small is a service institution and its first and most important service is to get airplanes of all types, whether commercial or private, in and out safely. Everything else is supplementary to this primary service. But there are other less obvious services that must be provided and here we have to recognize a fundamental difference between those airports serving airlines and those primarily used by private fliers. Many more services are and will be needed at airline airports. It may become quite a question as to who is going to provide these services and who is going to pay for them. This discussion deals with some of these problems of the larger airports, particularly in dealing with airline passengers.

Personalized Service

In pre-war years airline passengers were undoubtedly the most exacting group of travelers in the country. During the war they have put up with a lot but all along they have been paying a premium rate for a high type of travel service. The airlines recognize this and have spent considerable sums for harmoniously decorated plane interiors, for comfortable seats, for hostess service, for hot meals served aloft, and for the many other items that make passengers comfortable.

Therefore, at the end of his trip, when an air traveler steps from the plane, he must not be forced to enter an air terminal building where conditions are far from satisfactory, as they now are in many places. The passenger who has been surrounded with luxury and super-service in the air should not have to spend his time between planes at junction points in a dirty, noisy, crowded terminal building. This must not be tolerated in the future if our airports are really service organizations—the sales counters of air transportation.

Airport managers generally agree that their airports should be attractive to the general public and to sightseers, affording them parking place, an opportunity to see planes come in and go out, and the airport operations carried on as well as a place where an inexpensive, attractive meal may be purchased. The airlines want this, too, but at the same time they want their passengers served in the best possible manner with private, high-class waiting room, ticketing, and restaurant facilities to which, at some places, sightseers should not have access.

In return for the fare paid, the airline passenger is not only entitled to speed and comfort in the air, but also to greater cleanliness, and better handling in general than the ground traveler. This requires a standard of airport equipment and operation, including the station facilities themselves, far superior to the ordinary type of facility maintained for other agencies of transportation.

The typical railroad station, for example, is hardly anything more than a public street through which passengers walk to and from trains. Noise, impossible-to-understand announcers, and hangers-on are standard equipment. A good airport terminal building, while it must contain all the conveniences of a good railroad station, must certainly avoid incorporating the bad features of the average railway terminal and must make provision for comfort, privacy, and quiet, efficient service.

At the present time, because of the size of planes, air travelers normally congregate in smaller groups than they do when using rail or bus. In our present planes there is less space for private quarters, although there are, among air travelers, a large percentage of people who desire and can pay for privacy. This imposes upon the airlines an obligation to provide a high degree of personalized service on the ground as well as in the air, both in facilities and in the personnel involved. Space in the planes is at a premium, and the passenger naturally expects more in the way of completeness of service at terminals and intermediate stops.

Despite improvements taking place recently, few airport restaurants are up to minimum standards as far as the needs of air travelers are concerned. The time is here when a well-run, high-class restaurant can be

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IMPROVEMENTS AT LOVE FIELD in Dallas are scheduled to include additions to the existing terminal building as indicated by this drawing prepared by Tom Broad, architect. Existing building (A, top center) will have third floor and new tower added. A new left wing (B) will be a two-story building housing American Airlines and general office space. Similar right wing (C) will house Delta Air Lines and Braniff Airways. New building in center (D), for mail and cargo, will house central air conditioning unit and will be connected by tunnel with airport ramp. City-operated pay parking lot is also in center (E). To be erected later at bottom left (F) is a hotel. Covered walkways have topside observation decks and canopy covers 800 feet of curb parking at main buildings.

Denver's flat front yard is the site of an ambitious project to satisfy personal pilots. Fine runways, comfortable clubhouse and first class facilities are going in.

Sky Ranch for Private Fliers

By PRESTON DOERFLER

AT the eastern edge of Denver, Colorado, one mile northeast of KOA radio tower and four and one-half miles east of Fitzsimons General Hospital, is Sky Ranch Airport, largest private airfield in the United States. It is not for airline or military use but seeks to provide the utmost in convenience to the private or commercial pilot who flies on business or pleasure. It is privately owned and the management devotes its entire attention to private flying.

The Airport Site

Embracing 1,500 acres, the site chosen was the best available near Denver for many reasons. It and surrounding area are almost as flat as a floor, having ample space for simulated forced landing practice. With radio compass or direction finder, problems in orientation can be worked, using KOA radio tower and the nearby east leg of the Denver range. The site is far enough from the smoke of the city so that obstruction to visibility will be at a minimum. Station wagon service to and from the Sky Ranch is provided at nominal cost.

Airport Facilities

Present construction includes three runways, each 6,000 by 300 feet of specially compressed clay and gravel, so hard that there are no loose stones to be picked up by the propeller blast. The first hangar is 200 by 150 feet with space for classrooms, office, sleeping quarters for transient pilots and repair shops. The dope shop is a separate building 80 by 80 feet. Also on the airport is the private dwelling of the airport manager.

Future construction will include a clubhouse with accommodations for transient air travelers or those who wish to use the Sky Ranch as a base for air or ground touring of the Rocky Mountain region. Dining and recreation facilities will be included. As development progresses, a swimming pool, riding stables, miniature golf course, tennis and badminton courts will be added. These facilities will be available on a pay-as-you-go basis to transients and there may be memberships in the flying country club for permanent residents of this area.

Airport Manager is Willard F. Bridgeman, who learned to fly in 1918 and has been in aviation ever since. He has flown all sorts of planes under all sorts of conditions, and has also been on the pilot staff of Lockheed. For the past two years he has been Air Safety Investigator with the Civil Aeronautics Board.

Planes for Training and Sale

Students are now flying radio-equipped deluxe Luscombes, and a 450 hp. Beechcraft. Ercoupes will be added as soon as available, as the operating firm, Aero Enterprises, Inc., is Ercoupe sales distributor for Colorado, Wyoming and Montana. The Sky Ranch will serve as the hub of the distribution organization with an adequate supply of parts, supplies and new planes for rapid delivery to customers or sub-dealers. In addition to demonstrations at the Sky Ranch, a downtown showroom in the business district of Denver is being planned.

The School

At present offering instruction for private and commercial licenses, instrument and instructor ratings and horsepower ratings up to 675 hp., the flight school will also have other types of equipment as soon as it is available. Chief instructor is Ed Greene, who has logged several thousand hours as a civilian and Army instructor and who has flown ships from "Maytag" to Liberator size.

In addition to the classrooms for flight students at the Sky Ranch, a complete ground school is maintained in the business district of Denver at

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Headquarters of Aero Enterprises, Inc., are in a Denver office building. Here are three views of its modern interior. Top left is the reception room. Top right is entrance to one of the classrooms. Link training is conducted in the room at right. L. W. Mack, Sr., well known business leader, heads firm.

Terminal on Wheels for Small Towns

Mobile bus station, proposed for feeder line speed-up, would eliminate terminal building on small-town airports, allow pilot to keep engines running, dispense with taxiing delay.

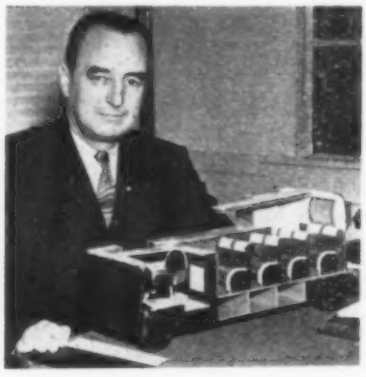
WITH application filed before the CAB for authority to operate a feeder airline in fifteen mid-continent states, Oliver L. Parks, president of Parks Air College and Parks Air Transport, Inc., has devised a bus-airport-station for use in smaller communities. Conceived as a connecting link from the business section to the airport, the mobile station would pick up passengers downtown and deliver them directly to the plane, thus saving time.

The proposed mobile airport station would eliminate the necessity of a terminal building, according to Parks, but where there is such a building, the bus-station would still serve the feeder airline's purpose. Constructed of stainless steel or aluminum, its built-in features include a ticket sales counter, toilet facilities with hot and cold water, an air conditioning unit, cargo and mail rooms and passenger space. It will be eight feet wide, about twenty-two or more feet long and nine to ten feet high. Passenger space would include four double seats, elevated, on the left side of the vehicle. The station-bus is still in experimental stages, models being the only structures built to date.

The unit performs like a station wagon, driving up alongside an airplane wherever it stops, delivering and taking passengers, mail or cargo, and serving the requirements of an airport terminal building. It will pick up passengers at convenient locations for transportation to the airport; it will also deliver incoming passengers to designated stops. Door-to-door delivery of express and cargo matter is to be maintained in the general business district. These services make the unit act as a taxicab, delivery truck, station counter, radio control tower, refreshment stand and rest room. The speeding up of service by direct delivery of passengers, mail and express to the plane will save anywhere from five to twenty minutes at each stop, thus on a ten-stop flight, more than two hours on the schedule will be saved, according to Parks.

Walter Beech in on Plans

One of the chief purposes is to cut down feeder airline schedules by eliminating delays at the airport, such as taxiing of the plane into position, stopping, restarting and warming the engines.



Oliver L. Parks is shown above with a model of a feeder airline bus he designed to eliminate passenger terminal delays. It would pick up passengers and cargo downtown, deliver them to runway where plane would be loaded or unloaded without cutting its engines. Cutaway below, shown by Philip C. Wagner, vice president and general manager of Parks Air Transport, Inc., illustrates cargo compartments and toilet facilities carried by bus.

The bus-station would team up for feeder airline service as the ground unit working in conjunction with a plane carrying eight to fourteen passengers. Parks has consulted with Walter Beech, the Wichita, Kansas, aircraft manufacturer, as to the design and engineering of the new type airplane desired for his airline service. Their opinion is that the feeder airline plane will be engineered to land with a ground run of not more than 1,000 feet, and take off fully loaded in that distance, making it practical to stop the craft near the center of a runway 2,600 feet long, then take off from that position. When the airplane door opens, a built-in stairway folds outward. This procedure will eliminate the time-consuming performance of taxiing the plane to the station, as done at all major airline terminals; taxiing out again to the start position on the take-off runway. Also, by shortening the stop to one minute or less, the airplane's motors will not need to be "revved up" before the take-off. This operation will make possible an operating schedule which allows for up to five minutes from the time the pilot shuts off power on approaching the airport, to regain his cruising speed after the take-off, according to Parks.

"The mobile airport station," Parks said, "will eliminate the necessity of a terminal building. Some small towns may not feel financially able to construct a station at the airport. Where terminal buildings are erected, the bus-station still will serve the feeder airline's purposes. The most important services will be delivering passengers and cargo direct to the airplane where it stops. This will make possible an operating schedule which allows for five minutes, no more, from the time the pilot shuts off power on approaching the airport to regaining his cruising speed after take-off."

Specifications for the mobile airport station are being studied by bus manufacturers and cost estimates are being figured.

The bus-station driver's duties will include operation of these facilities: standard equipment for a bus; two-way radio; loud-speaker system; ticket and sales counter; refreshments; cargo and mail; the lavatory and air-conditioning units in the rear of the bus; and telephone. ★ ★ ★

Your terminal need not suffer loud-speaker jitters. Here's a cure that worked from the beginning at Lockheed Air Terminal.

All public address announcements at Lockheed Air Terminal are made by PBX operators using written announcements. Note handy mike, control panel. This system eliminates confusion, variety of inaudible voices, waste of time.

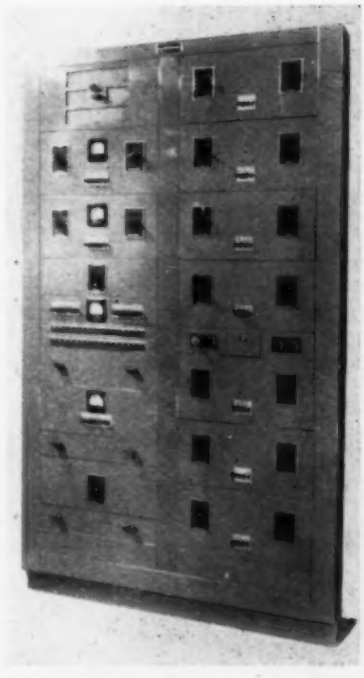
Control panel is compact, located next to PBX board.

By DUDLEY M. STEELE
Airport Manager
Lockheed Air Terminal

Solution for P-A Problems

PUBLIC announcements at airports have run the gamut from shouts in a megaphone in the early days to the present-day streamlined public address system. Some years ago our terminal was equipped with what was then considered a fairly decent public address system. Each of the loading gates and various other points throughout the terminal were equipped with microphones. Airline passenger agents and others responsible for the handling of such announcements made them when occasion demanded. The particular system in use at that time employed tubes which required about ten or twelve seconds to warm up. Many times the person making the announcement started too quickly and the public lost a considerable portion of the announcement. With the different individuals making announcements there was no possibility of adjusting the radio for proper modulation. High pitches, squeaky voices, deep bass voices, and in-between types, plus poor diction and enunciation, often made the announcements 50 per cent intelligible.

One day the author heard a very fine and dignified announcement concerning the arrival of a train in the Los Angeles Union Station. From that moment he conceived the plan to install a similar public address system in the terminal and make all announcements from one source. Shortly thereafter the most modern public address system then known was installed at Lockheed Air Terminal.



Lockheed Terminal's amplifier equipment is mounted on one rack, shown here with panels in place. Left-hand rack, from top to bottom, are: Compression amplifier No. 1, compression amplifier No. 2, isolation amplifier, patch strips, meter panel, speaker fields power supply, and dry rectifier relay supply. On right-hand rack are seven bridging amplifiers.

Prior to the installation of the system, we talked with all the airlines in an effort to get them to agree to have the announcements made at one central point. To do this meant that Lockheed Air Terminal would have to stand the expense involved, which was considerable. In spite of this and the very evident saving in time to the airline personnel who formerly made the announcements, the airlines objected strongly. They gave us many and varied reasons why our thinking was erroneous. They said it would delay matters; that we could not hope to make the announcements as they wished them to be made; and many other reasons. Finally, however, we convinced them that, with the aid of a hot microphone, there would not be a delay, but on the contrary, a saving of time. Next, we convinced them that we could make whatever announcements they wished to make if they would put such announcements in writing. This was done.

We then attempted to select girls as telephone operators who had good, clear, low-pitched voices. We trained them in the use of the microphone. There were the inevitable mistakes at first, but thirty days after the announcements began from the central point, which incidentally is our tele-

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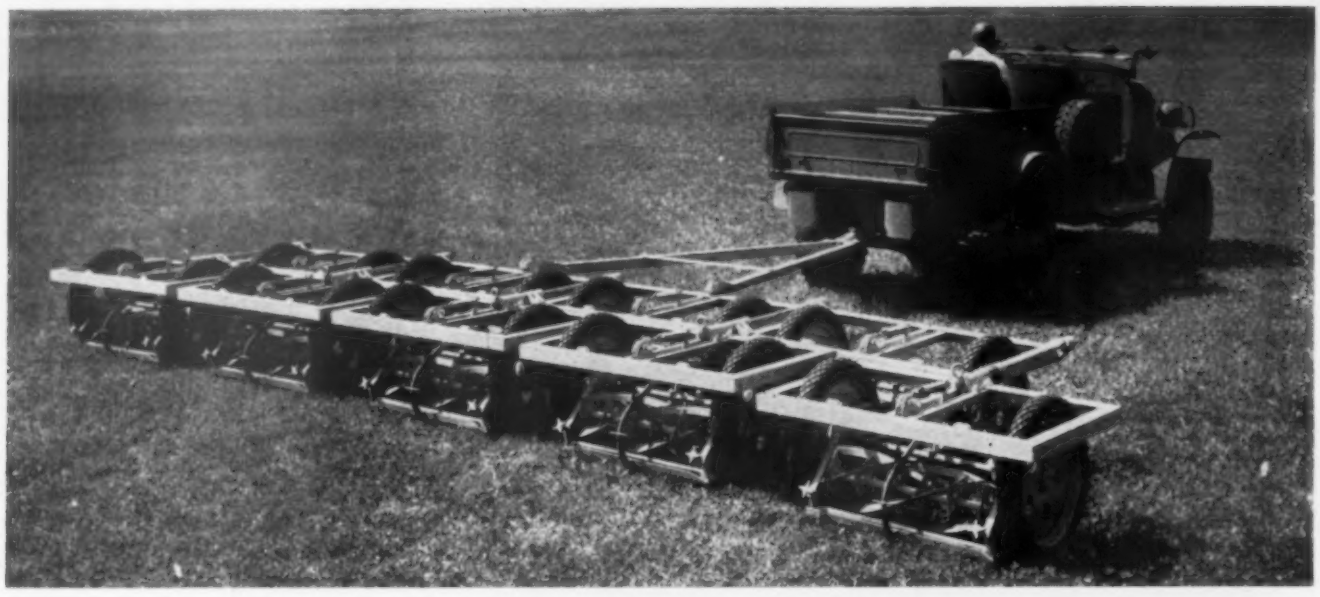


Economy and more effective turf maintenance have resulted from use of nine-gang reel-type mower, such as this truck-towed "blitzer" photographed on an Army airfield. It cuts twenty-five to forty acres per hour. —(Worthington Photo.)

Maintenance of Unpaved Areas

By D. E. GRIFFITHS
Chief, Ground and Grassing Section
Headquarters, 8th Service Command

OBJECTIVES for maintaining the unpaved areas of airports which are usually referred to as "grounds" can be generally divided into three parts: one, to provide areas suitable for occasional use; two, to protect paved areas and other facilities from water erosion, and three, to eliminate as far as possible the hazards of dust.

Policing

As soon as construction activities have been completed on the airport, policing should be started and continued as an extremely important function of grounds maintenance. All rocks, stakes, stumps, wire, glass, rags, cans and other materials which might interfere in any way with landings or mowing operations should be removed from the field. A few hours of conscientious work can save many dollars in repair bills to maintenance equipment and airplanes, and can conceivably save the lives of flying personnel. The initial removal of all potentially damaging materials is only the beginning of an operation that must be continued as long as the field is in use. Constant and continuous vigilance must be followed to keep the field free of rocks that have become exposed, metal parts that have dropped from planes, pop bottles tossed thoughtlessly from automobiles, and other obstructions. There is nothing to be gained when a mower operator removes a steel cable from the sickle or reel and tosses it into the area already cut. The efficient supervisor will install a box or other receptacle on every piece of maintenance equipment and will require that operators pick up all trash encountered and remove it from the field.

Fences and guards should be maintained around the airport so that sheep, hogs and other livestock cannot gain entrance. Particular care should be exercised in areas where there are no stock laws.

Damage to equipment, installations and personnel can be severe if corrective measures are not installed and maintained to control dust. The type of dust control measures installed as a part of the construction program will determine the type of maintenance that must be followed. If an oil dust palliative has been applied, it is very important to restrict both pedestrian and vehicular traffic to designated runways, taxiways, aprons, parking areas, roads and walks. This type of dust palliative treatment is effective for a comparatively short period of time, usually not more than twelve months. Application of oil is expensive and does not completely control dust, but it is often used as an emergency temporary measure. In most cases where this treatment has been accomplished it is more economical to apply other dust control measures as soon as deterioration has progressed to the extent that oil is no longer effective.

The most satisfactory method of controlling dust either as a part of construction or as a maintenance function is the establishment of a perennial grass cover. However, it is practically impossible to re-establish a permanent cover on airports located in the low rainfall belt without first providing temporary dust control and protection for delicate grass seedlings. This is especially true where large areas of the field constitute either a cut or a fill to establish satisfactory grades and provide adequate drainage. In areas where summer rainfall is sufficient to support Sudan grass or sorghum, temporary dust control and protection for grass seedlings can be provided. Sudan grass should be drilled in late spring or early summer at a rate of from twenty to thirty pounds per acre. The

temporary crop should be mowed once or twice to a minimum height of eight to ten inches to prevent production of seed that would compete for moisture with perennial seedlings during the following spring and summer.

In areas where satisfactory cover cannot be grown by the use of temporary crops, non-competitive mulch in the form of prairie hay, straw or sorghum stover has been practiced for several years in the arid sections to control dust, prevent shifting of sand, and provide protection for perennial grass seedlings. Mulch can be established by first thoroughly loosening the soil to a depth of from four to six inches by chiseling, discing or plowing. This treatment alone will control dust temporarily by exposing a rough surface. Hay or other mulching material should be spread evenly over the surface at a rate of from one and one-half to three tons per acre, depending upon the type of materials, kind of soil encountered, and other factors. Material can either be spread by hand or by the use of special machinery designed for the purpose and constructed from discarded combines or threshing machines. As soon as mulching material has been spread it should be anchored into the soil by making one or two passes with a land packer, disc harrow with discs set straight, "sheep's foot" roller with drum rotating opposite to normal direction, or with any other machine that will press material into the soil without cutting. All operations can normally be accomplished for approximately $25.00 per acre, exclusive of the cost of the material. Other materials have been used satisfactorily as mulching materials such as cotton burrs, wood shavings, rice straw, shredded pine cones, pine needles and the like. Every effort should be made to use materials readily available if they will accomplish the purpose desired.

Seeding Permanent Grasses

Although vegetative mulch and Sudan stubble will successfully accomplish dust control for from one to three years, perennial grasses should be established as soon as possible since a living vegetative cover is recognized as the most practical method of controlling both wind and water erosion. Native grass seed can be successfully drilled into both mulched areas and Sudan stubble by using a special machine known as a native grass seed drill. The outstanding features of the drill are: planter boxes instead of the standard grain box, clean seed attachment for planting small smooth seeds, multiple adjustment to plant almost all types and rates of chaffy grass seeds, and double disc coulter openers with rims to permit planting at desired depths. Double discs equipped with depth gauge rims will cut through mulch without noticeably disturbing the protective cover. Press wheels seal seed into the furrows and the entire seeding operation does not appreciably change the appearance of the field. Seeding should be accomplished as early as possible in the spring so that grass seedlings will have a chance to become established before weeds can give serious competition. Mixtures of perennial grasses are usually more satisfactory than seeding one species alone. Care should be taken, however, to plant only those species that have a reasonable chance to survive. Blue grama, side-oats grama, buffalo grass, sand dropseed, western wheat grass and crested wheat grass are native species that have been used successfully in the arid sections. The wheat grasses should only be used in higher altitudes of western Oklahoma, West Texas, and New Mexico where their adaptability has been proved. Buffalo grass does not thrive in areas where normal rainfall is below twenty inches per year. Care should always be taken in purchasing and planting native grass seeds to make sure that purity and germination are satisfactory. Care should be exercised also in selecting species of grass that are adapted to the areas where planting is proposed. Thousands of dollars have been wasted by attempting to establish Kentucky blue grass, fescue, timothy, redtop, and other species in the Southwest simply because seeds were available.

Winter-growing annuals such as cereal rye, ryegrass, wheat, oats, and barley can be used successfully in semi-arid regions to provide temporary dust control if construction of the airport is completed during the late summer or early fall. These grasses should be replaced on the permanent airport as soon as possible because of the difficulty and expense of maintaining a rotation of Sudan for summer cover and winter-growing annuals for winter and spring cover.

Maintenance of Newly Established Grass

The importance of properly maintaining areas that have been newly sodded or seeded cannot be overemphasized. Unless traffic is restricted from planted areas and unless frequent mowing is accomplished, money and effort spent in planting grass will likely be wasted. Sod-forming grasses cannot successfully compete with Johnson grass and other tall growing weeds, especially in the early stages of growth. Weedy vegetation should not be permitted to grow tall enough to shade and compete for moisture with desirable grasses. If grass is planted immediately adjacent to runways, taxiways, or other paved areas, it should not be permitted to silt up and trap water on such areas. In order to accomplish rapid drainage without ponding and without concentration, sod should be maintained so that a grade of approximately two and one-half inches drop in the first four feet from the edge of the shoulder will exist at all times. Flatter grades can be maintained several feet away from the runway. However, drainage facilities should be maintained so that water will not be impounded on, or will not sweep across paved surfaces.

Erosion Control

The axiom "a stitch in time saves nine" can be definitely applied to erosion control. Constant vigilance, proper maintenance of grassed areas, and attention to miniature washes are much easier to accomplish than the repair of enormous gullies that have been permitted to develop. It should be kept in mind that all areas within the boundary fence that are not paved or are otherwise covered are subject to erosion even on comparatively flat slopes. The first duty of the successful grounds maintenance supervisor, therefore, is to make sure that drainage facilities are adequate and that all unpaved areas are covered with vegetation. If rains of a high intensity are received, which cause rivulets and miniature gullies to form over the field, these should be repaired immediately by filling with soil containing grass roots or by filling and seeding to fast growing grasses. It is good practice for the supervisor to carry a number of miniature red flags in his vehicle during his regular rounds of inspection. These flags can be used to indicate all areas that need attention such a small gullies, holes, hummocks, exposed rocks, ruts and other obstructions that might interfere with flying or maintenance operations. Attention to such marked areas should be given immediately. Needed repairs should be made daily on the entire field in order to accomplish preventive maintenance. It is much more sensible and practical to fill a rivulet today than to repair a gully tomorrow. On airports located in East Texas and parts of Arkansas and Louisiana, burrowing animals such as moles and gophers can cause much damage. In the more arid sections of the Fourth Region red ants can destroy large areas of vegetation. Damaging dust can be blown from areas denuded by red ants, and both hummocks and gullies can be formed as a result of burrowing animals. Careful inspections should be made at regular intervals, and all red ant beds and gopher and mole tunnels should be treated with approved poisons to control these troublesome pests.

Mowing

Mowing is necessary to keep vegetation at the required height. Frequency of mowing will depend upon the type of grass, the fertility of the soil, and the amount of rainfall received. During periods of high rainfall more frequent mowing will be re-

MODEL AIRPARK FOR MISSOURI is being established at Eldon, town of only 2,500 population in center of the state, to demonstrate practicability of inexpensive, self-supporting small-town airparks. With June 1, 1945, set for the formal opening, citizens and officials are working with E. V. Fryhoff of the Missouri Resources and Development Department to develop the project as a model undertaking. Complete records are being compiled as work progresses and will chart such items as financing, costs, management, maintenance and revenues.

quired than during a dry season. When grass is dormant no mowing should be done except when it becomes necessary to control the growth of tall weeds. On sod-forming grasses such as Bermuda and carpet, three inches should be the minimum height of cut on the airport, especially if unpaved areas are used frequently. There has been considerable discussion during the past few years on the proper height of cut for airport grasses. It should be kept in mind that the requirements of grass on an air field are quite different from conditions found on golf greens, fairways, cow pastures, meadows, etc. It has been found that even sod-forming grasses have root development in direct proportion to the amount of vegetation existing above ground. Areas where grass is repeatedly clipped to heights of approximately one-half inch cannot possibly survive over a long period of time without giving them the care of a golf green. Where grassed areas are used occassionally for the landing of aircraft, it is especially desirable that grass be maintained at heights of from three to five inches. Stability of a grassed surface is increased where there is sufficient vegetation to simulate a shingled roof or a duck's back when landing wheels first make contact with the surface. There is also noticeably less damage to a grassed surface from traffic and prop-wash where there is sufficient "above-ground vegetation" to act as a cushion or shock absorber. On areas that have been planted to bunch grasses or where the native cover consists largely of bunch grasses, mowers should be set to cut not lower than four to six inches. Frequent low cutting will actually starve out most bunch grasses over a period of time. Attention has already been called to the importance of thoroughly policing all areas of the field before mowing is started.

Normally, it is much more economical to accomplish mowing by the use of reel-type gang mowers. The general aim should be to keep the grass at a level of from three to five inches as the most practical height. During a very wet season the soil may become so unstable over a long period of time that grass is permitted to become too tall for the reel-type mower to handle successfully. In such cases mowing must be accomplished with the sickle bar mower, and the grass, if too heavy, will have to be raked up to remove it from the field.

Since the soil on most airports is normally low in organic matter, especially where much cutting and filling has been necessary, grass should not be raked and removed unless absolutely necessary to prevent fires and to prevent smothering of grass. Clippings resulting from reel mower cuttings should be left on the ground where they serve as a mulch, help to retain soil moisture and return organic matter and plant food to the soil. Although grassed areas immediately adjacent to runways and taxiways would normally receive more intensive maintenance, it has been proved that it is more economical to mow grass five to seven times with a reel mower than to mow the same area one time with a sickle bar mower. The greater economy in using a nine-gang mower, cutting from twenty-five to forty acres per hour as compared with the use of a sickle bar mower cutting three to four acres per hour, should be quite obvious without further comment. Where reel-type mowers are used exclusively it is advisable to change the direction of travel with each mowing operation. A cleaner cut can be obtained, and normally, there is less wear and tear on the machine itself. The recently developed nine-gang air field mower, which cuts a twenty-one-foot swath and can be pulled over smooth ground at speeds of from fifteen to twenty miles per hour, has proved to be the most satisfactory machine for maintaining large grassed areas. Height of cut can be adjusted from three inches to approximately eight inches with little loss of time. This machine is mounted on pneumatic tires and can be pulled satisfactorily with a light farm-type tractor if vehicles with higher speeds are not available. Other reel-type gang mowers can be used satisfactorily, but normally are not as well adapted to maintaining grass on airports as the machine mentioned above.

All mowing operations should be closely co-ordinated with the control tower so that hazards will not result from the presence of the machine on the field. One advantage in using a high speed reel-type mower is that large areas can be mowed within a short time, thus permitting maintenance during parts of the day when the field is not being heavily used. Reel-type mowers in gangs of three, five, and even seven can be used to advantage in small isolated areas or between buildings more advantageously than sickle bars. The following summary shows the approximate time of mowing for several types of machines:

Farm or highway tractor and sickle, 7 ft. mower bar—3½ acres per hour.

Golf course tractor, 7-gang mower—11 acres per hour.

Airfield tractor, 9-gang mower—46 acres per hour.

Power mower, 30 to 32 inch—4 to 5 acres per 8-hr. day.

Power mower, 25 to 26 inch—2 to 3 acres per 8-hr. day.

Power mower, 22 inch—1½ to 2 acres per 8-hr. day.

Hand mower, 18 inch—1 to 1¼ acres per 8-hr. day.

Machine Maintenance

It might be well to say a word relative to maintenance of mowing equipment. Contrary to the usual belief, a mowing machine, whether reel or sickle-type, is a complicated piece of machinery that must be kept properly adjusted and repaired before satisfactory mowing can be accomplished. An attempt to cut a piece of heavy cardboard with a pair of scissors which has a loose fulcrum screw will convince anyone of the importance of maintaining proper adjustment between the cutting knife and the bedknife or guard plate. Reel mowers should be adjusted so that the full length of every reel blade will barely wipe the bedknife from one end to the other. If the reel blades should become bent or gapped, they should be hammered, straightened and filed as soon as damage has been done. A sharp cutting edge should be maintained on the flyknife and the bedknife at all times so that an even cut can be obtained with a minimum draft. This condition can best be maintained by an inexperienced operator by using the "lapping-in process" instead of by grinding on commercial sharpening machines. Many reel-type mowers have been ruined by grinding excessive amounts of steel

PAYLOAD IS PEOPLE OR PACKAGES

A most cursory study of the Constellation's performance records indicates immediately that it can never be considered a one-job transport. *Versatility* is the word. Interiorwise, for instance, the Constellation is easily adapted to meet the commercial demand of the specific route, to carry its payload in terms of people or packages or both. Flightwise, it is able to operate most economically over the specific distance required—whether transcontinentally *or on flights as short as 100 miles.* Indeed, versatility is the word. Express, sleeper or inter-city local, the Constellation is designed to solve *special* problems of the individual airline.

The Lockheed Constellation

SETS THESE NEW WORLD STANDARDS

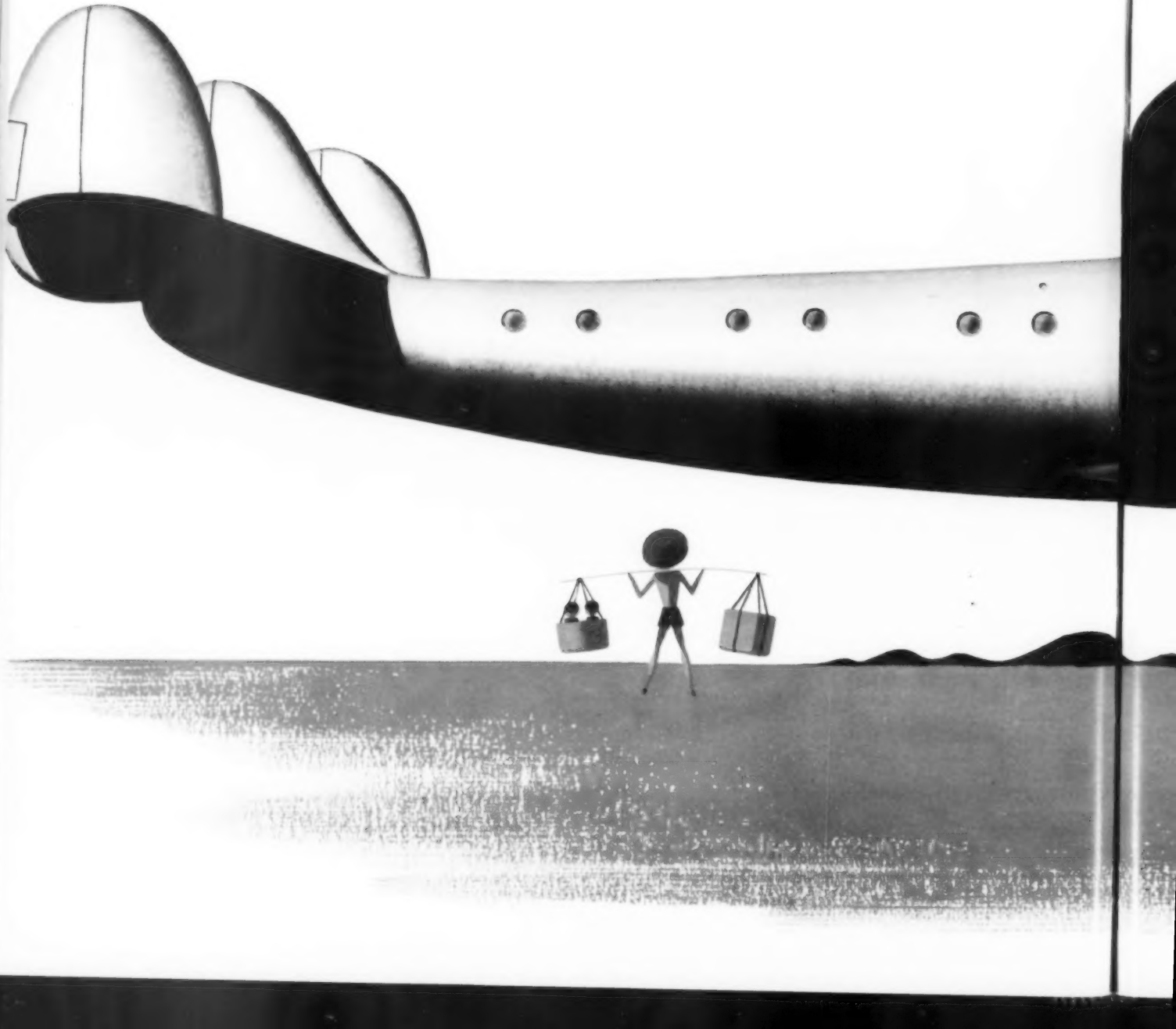
Biggest load-carrying capacity of any transport

Longest range of any transport ☆ Fastest speed of any transport

Greatest rate of climb of any transport ☆ Highest cruising altitude of any transport

And these performances make the Constellation

the *safest* of any transport



Leadership

IN LOAD-CARRYING CAPACITY

Lockheed's Constellation is a big plane—big enough, in fact, to carry 64 passengers and their baggage. In addition, it has adequate space for mail, express and cargo. Two compartments totaling nearly 500 cubic feet are available and may be loaded and unloaded underneath the plane. Revenue loads of approximately 18,000 pounds can be carried easily by the Constellation on medium-distance operations.

QUESTIONS

Q. Are oxygen masks ever necessary when flying in the Constellation? —M. G., Maplewood, N. J.

A. *No. Constellation passengers never go above 8,000 feet even if the plane's altitude is as high as 20,000 feet. Automatic devices control density, heat, purity and circulation of air in passenger compartment.*

Q. Why does it take so long to develop a new transport? —John T., Baton Rouge, La.

A. *In addition to hundreds of thousands of man-hours of basic engineering, literally thousands of tests are made in the wind tunnel before an airplane is built. On the Constellation, a complete hydraulic system, duplicating the entire functional mechanism of the airplane, was constructed and tested for months to assure perfection of all parts.*

Q. Is there a reason for the sharklike profile of the Constellation fuselage? —Tom P., Los Angeles, Calif.

A. *Yes. Its airfoil design allows maximum length for full-round pressurized cabin. Down-sloping nose camber gives better pilot visibility—reduces landing gear weight.*

Q. You say the Constellation is a safe airplane. Why? —R. L., Springfield, Mass.

A. *In the first place four powerful engines mean greater safety. The Constellation will CLIMB on any two of them, land or take off fully loaded with a very short run, and is able to fly over bad weather. In addition to its great power there are scores of other safety features. A few of them are: tricycle landing gear, automatic fire extinguishers and power boosts on operating controls.*

Send in your questions . . . Address: Lockheed Aircraft Corporation, Department 69-55, Burbank, California

LOCKHEED

FOR NEW WORLD STANDARDS IN AIR TRANSPORTATION

LOOK TO *Lockheed* FOR LEADERSHIP

Lockheed Aircraft Corporation, Burbank, California

from the cutting assembly. Sharp sickles should be used and proper alignment should be maintained at all times between guard plates and sections on the sickle. A few minutes spent in making adjustments each half day will prevent costly repair bills over a period of time.

Burning

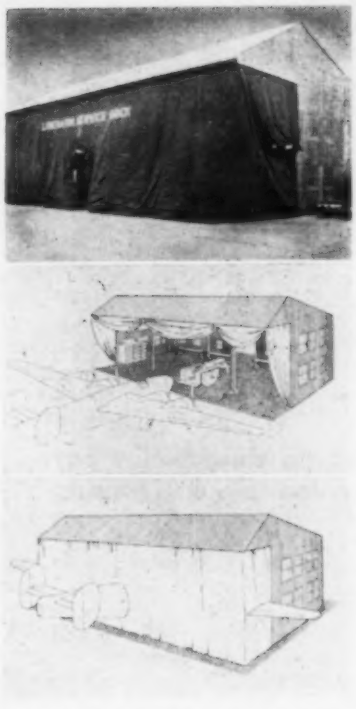
Very frequently the question arises as to the desirability of burning over portions of the air field. Mention has already been made of the fact that grass clippings should not be removed, inasmuch as they provide mulch, add organic matter and plant food to the soil, retain moisture and provide a cushion on the surface. The general burning of grass and other vegetation quite often destroys the vegetative cover on large areas and frequently intensifies the dust erosion problem. If normal mowing is accomplished in a satisfactory manner, the need for burning should never exist. The belief that burning encourages spread of grass and encourages establishment of a more dense cover cannot be substantiated.

Fertilization

Fertilization should be applied to grassed areas only when inherent soil fertility is inadequate to support grass which will provide satisfactory landing surface and control wind and water erosion. There is no justification for applying fertilizer simply because it makes grass greener and more pleasing to the eye. Fertilizer should only be applied when grass shows a definite lack of vigor and is not accomplishing the desired results. Fertilizers are especially needed on sandy soils or on areas where sterile subsoil has been exposed. Ordinarily, they should be applied just before spring growth is started and should be spread uniformly with machines designed for the purpose. Rates of application will depend largely upon fertilizer used, condition of grass and other factors. It is unwise to give grass a generous feeding only a short time before dry periods are expected, or before severe frosts are likely to occur. This is especially true in the northern half of the Fourth Region where succulent grass with roots near the surface is more likely to be injured by cold weather. In the western half of the Fourth Region rainfall is usually the limiting factor in plant growth, and the general use of fertilizers is not recommended.

Traffic Control

Usually half the problems of the grounds maintenance supervisor are solved if traffic can be strictly limited to runways, taxiways, aprons, roads, sidewalks, and other designated areas. All dust palliatives, mulch applications, and similar treatments for dust and erosion control are soon rendered ineffective by uncontrolled traffic. It would be well if all personnel of the using agencies could be made to realize the problems confronting the man responsible for maintaining grounds. Of course, the object of an airport is to permit the operation of aircraft. However, the practice of blasting grassed areas with propwash, taxiing needlessly over unpaved areas, wasting oil on both paved and grassed areas, and throwing oily rags to the four winds can cause no end of trouble.



PREFABRICATED SHOP for combat areas has been developed by Consolidated Vultee Aircraft Corporation. Built of steel and having dimensions of 49 feet 6 inches fore and aft, 65 feet 8 inches side to side, and 27 feet 11 inches height, the "service dock" can be erected in only three days by a crew of eight, using minimum equipment. Facilities which go with it include work benches and tools normally required for aircraft servicing. It will withstand 80-mph. gusts or a steady 70-mph. wind.

Conclusions

The job of maintaining the unpaved areas of an airport should be assigned to one man who is well versed in all phases of this work. He should know the requirements of using agencies, he should be supplied with necessary equipment and materials, and he should be given full responsibility and necessary authority for the performance of his job. The net result should be a smooth landing field, free from dust and gullies, well-drained and policed, properly mowed, and in short, a credit to aviation of the future. ★ ★ ★

YOUR REVENUE DOLLAR

(Continued from page 51)

should be clearly shown when sending in your entry.

Entries will be judged on the basis of general efficiency in airport management as reflected by the percentages making up each airport revenue dollar.

We know of no better way of acquainting airport managers generally with ideas developed by the other fellow than by this contest. Our sole aim is to encourage the exchange of ideas and stimulate interest in profitable airport merchandising to the end that all concerned will benefit. ★ ★ ★

PUBLIC ADDRESS SYSTEM

(Continued from page 57)

phone room, the airlines were completely sold and it is now felt that none of them would return to the old methods. We combine a telephone operator with the P-A operator. On a pedestal attached to the PBX switchboard is a spindle. On this spindle in separate compartments are the announcements for the arrivals and departures of each airline and all of its schedules. There are in addition, announcements for: "arrival of passengers' baggage," "limousines for X-airline are leaving immediately," "special announcement calling certain individuals to airline ticket offices," etc. The time required by an airline to have an announcement made is less than fifteen seconds. We now make from 700 to 800 announcements over the P-A System daily. The time saved to airline employes in thus relieving them of this duty is considerable. Obviously, time saved translated into dollars means a great many dollars saved to the airlines yearly.

We now have two airlines operating from this terminal into Mexico—Pan American Airways and American Airlines. We have recently been requested to make the announcements of the departures of planes of these airlines going to Mexico in Spanish. At first the airlines involved wished to make a record which could be played on a turntable. Instead of utilizing this method, however, we secured the services of one of the airline representatives who taught our operators sufficient Spanish to permit them to make the announcements necessary. Our operators (all girls) took to Spanish like the proverbial duck does to water, and within a short time it is doubtful that there will be any accent noticeable in their Spanish announcements.

As a means of speeding up public announcements and in eliminating the endless confusion resulting from the system whereby each airline makes its own announcements, the system which we employ is strongly recommended to other airports. It is believed that airline representatives at this terminal will strongly recommend it for consideration by other large transport airports. ★ ★ ★

Hangar and Shop Space Obtained by Southeastern in Atlanta

Southeastern Air Service, Inc., has announced arrangements for opening an operations base at the Atlanta municipal airport as another link in its sales and service system.

Under a long-term lease, Southeastern has acquired more than 22,000 square feet of hangar and shop space, which is being remodeled into top notch maintenance, repair and storage facilities. A lean-to building is being made into office space.

Hangar and shops formerly were used by Delta Air Lines as a modification center in carrying out Army and Navy contracts. The lease was from H. W. Clay, operator of Gate City Flying Service.

Sales, student instruction, charter flights and repair will form a large part of the Atlanta base activities, the company said. Southeastern has bases in operation at Athens, Ga., and Macon, Ga. In co-operation with individual operators in smaller cities throughout the area the company is building up a system of associate bases, which will offer standardized sales and service.

California Conference Held in Los Angeles

The California Aviation Conference was scheduled to be held at Los Angeles, December 12 and 13, sponsored by the chambers of commerce of seven California cities. Speakers were to be Robert F. Craig, University of Southern California; Robert W. F. Schmidt, 6th Region, CAA; Loyd Wright, Chairman, Project Committee on Aviation; Oscar Trippet, Los Angeles Chamber of Commerce; Edward H. Gaylord, deputy county counsel, Los Angeles County; Dr. Robert Kingsley, University of Southern California; W. H. Rosenthal, California Assembly, interim committee on aviation; Hall L. Hibbard, vice president and chief engineer, Lockheed Aircraft Corp.; Lowell Swenson, manager, National Aeronautic Association; B. M. Doolin, manager, San Francisco Municipal Airport; Earle A. Lloyd, director, Long Beach Municipal Airport; and Dudley M. Steele, manager, Lockheed Air Terminal.

AITI Resumes Civilian Enrollments for Instruction

Aero Industries Technical Institute, Los Angeles aviation school, announces resumption of civilian enrollments which were discontinued when Aero I. T. I. was appointed by the Army Air Forces as one of the major training schools for enlisted personnel.

Instruction at the Institute is to include the following courses: Flight Engineering, Aircraft and Engine Mechanics, Airport Management, Instrument Technology and Flight Training.

V. D. Vale Revamping Embry-Riddle School for New Training Role

Verner D. Vale, new technical director of Embry-Riddle School of Aviation, will complete the reorganization of the school in preparation for new training programs for veterans and civilians. Vale, once civilian training administrator with the Air Service Command, has owned and operated his own airport and flying school, served with the Army Air Corps, and has worked with aeronautical companies such as Curtiss-Wright, Fisher Aircraft Corp., and others.

Florida Conference Set for Jan. 5-6 at Orlando

George M. Dunn, executive secretary of the Aeronautical Advisory Commission of Florida, has announced that at a program-planning meeting held in St. Petersburg some sixty aviation leaders made arrangements for a State-wide aviation conference at Orlando, January 5 and 6. This meeting will be under the sponsorship of the State N. A. A. Council, of which Harry Playford of St. Petersburg is president and William S. Howell is secretary and treasurer. Dunn said that the conference will co-ordinate activities of the numerous groups interested in the advancement of aviation in Florida.

CAA Offers Airways Jobs in War Effort

Jobs as aircraft communicators for the returned service man who has had some communications or aviation experience, and for other similarly qualified men and women eager to help in the war effort, have been announced by the Civil Aeronautics Administration. Veterans will be given first preference.

Between 300 and 400 such jobs are open, and the CAA has arranged for an intensive training course of six weeks, during which the trainee will receive pay at the rate of $2,190 a year. Upon completion of this training, the first class will be assigned to jobs in the field at the rate of $2,000 a year, which, with government overtime pay, amounts to $2,433. When the second class has completed its six weeks of training, members of the first class are scheduled to return to the training centers for additional instruction before receiving permanent assignments.

Aircraft communicators work in CAA airway communications stations at landing areas throughout the United States and Alaska, and provide airmen with the information and communications necessary for safe flight. Since the traffic on the airways is now 85% military, the job is definitely war work.

Detailed information is available at any United States Employment Service office at Civil Service offices and CAA offices.

TRANSMISSOMETER receiver unit (photoelectric cell) used for measuring visibility by means of a small spotlight 2,000 feet away, focused on receiver. Direct visibility reading is transferred to control tower. Experiments are still being made by CAA.
—CAA Photo.

Idlewild Engineer Cites Latest Features of New Base

Recent additional figures were given in an Institute of Aeronautical Sciences address by Jay Downer, chief engineer, on New York City's international airport at Idlewild. Eighteen million cubic yards of sand were pumped from Jamaica Bay to fill the Idlewild Airport site to a level well above the highest tides, and after consultation with plane designers, it was concluded that the weight of land planes would probably not exceed 150 tons, and taxiways, runways and aprons are being built to accommodate that weight.

The first stage of six runways is being constructed; the second stage could be constructed in accordance with either a parallel or a tangential plan. The first stage layout provides for three pairs of parallel runways, spaced more than one mile apart. Six additional runways will eventually be constructed. The layout called for acquisition of enough land to accommodate an ultimate twelve-runway system; a central area of 306 acres necessary to handle up to 240 plane movements per hour; administration building and control tower, and space for parking. The site now has a total of 4,057 acres. Engineers are laying out all improvements, utilities, drainage, hangars and other buildings with the secondary stage in mind.

Idlewild's location is seventeen miles from the Air Terminal Building in Manhattan. It takes about thirty-five minutes to drive from this point to the airport, Downer said. Originally, the airport was intended for seaplanes,

but it appears, he said, that facilities at LaGuardia Field are adequate for the existing need.

The first stage calling for six runways includes two 10,000 feet long; one 8,200; one 7,500; one 6,500; and the shortest 6,000 feet long. This short runway equals the longest at LaGuardia Field. All runways are 200 feet wide and will be framed on each side by 50-foot stabilized shoulders for drainage. Taxiways will be 100 feet wide. The lighting of the field will be conventional type, in accordance with C. A. A. standards, and a block system will be installed between the apron and runways to guide and control planes moving to and from the apron.

Service for NAA Units

Announcement of a Chapter Service Department organization to provide general and technical aviation information for local units of the National Aeronautic Association was made by Lowell H. Swenson, manager of the Association. The new division will stress private flying and landing facility development. Swenson said that it was the responsibliity of N. A. A. to provide its member chapters with all the information possible. To accomplish this, the Association has developed a fourfold chapter service program, providing material and information on a wide range of aviation topics.

THE AIRPORT AND AIRLINE PASSENGERS

(Continued from page 54)

made to pay at practically any of the major airports. There are several outstanding examples where restaurants are attractive, where good food is served; the operators of these restaurants are making money. In contrast to these few, however, the average airport restaurant would not do credit to a bus station.

Suggested Improvements

All airports today lack any way for passengers to go aboard or deplane without getting out in the rain and walking some distance. All-weather canopies for protection against rain and snow as well as sun seem to be an essential part of a proper airport in the future. Passengers will not much longer tolerate the use of individual umbrellas and similar makeshift devices which are certainly not in keeping with the standards of service that the airlines want to maintain.

Viewed in the light of certain expansion, automobile parking facilities at most airports are at present wholly inadequate. In addition to outdoor parking facilities, the airport used by airlines at the larger towns should also provide a garage for the use of air travelers who are planning to return within a day or so and find the storage of their car during their absence a decided convenience.

There is much that can be done to improve the general appearance of nearly all airports and the approaches to them. The airport, far more than a railroad terminal, lends itself to beautification by municipal or county park authorities. The airport should be the principal park project of any municipality. With development of pride in the municipal airport as a public park, it is almost equally important to be sure that the municipality provides, in its operating personnel, the best management, courteous policemen and attendants. Often the whole atmosphere of an otherwise well-equipped airport is destroyed through discourteous and unprepossessing municipal employes who give to the air traveler a distinctly poor impression of that community. An airport administration providing an appearance of military proficiency in the deportment of all personnel, whether airline or municipal, instills confidence in keeping with the major effort of the airlines to provide safety. There is nothing that detracts so much from the creation of confidence on the part of air travelers, particularly the first-time passengers, than the hurrying about of many members of the airline or airport personnel, the indifference of personnel, or the giving of an appearance that the whole airport operation is conducted without precision and order.

Considerable improvement can and should be made in the handling of planes on airport ramps and all the mechanical accessories involved. The many gasoline trucks, air conditioners, loading stands, baggage carts, and electrical equipment duplicated by each airline should be studied for simplification. This will require a higher degree of standardization among the airlines and a genuine effort on their part to work together in the handling of commonly necessary and commonly used ramp equipment.

Most of the matters just mentioned are obvious, but because they are so obvious, they are often neglected. They should be corrected. Perhaps not immediately, but by constantly keeping after them, they can and will be improved in most instances. Airport managers must realize how important it is for their city to have the hundreds of thousands of air travelers speak well of the portion of the city that they see. The airport reflects, to a great number of air travelers, the whole city. It should make them want to talk about it as a good place to be in, a good place to live, and a place to which they want to return. And one thing, above all others, to sell a city to air travelers is the good service of an airport — the airport that is a real service organization is a great asset to its town. ★ ★ ★

SKY RANCH

(Continued from page 55)

Suite 625 Mack Building. All sorts of equipment for the Link trainer down to five-cent gadgets have been or will be added to make learning as easy as possible.

The writer is ground school supervisor. He has taught civilians, cadets and commissioned Army pilots for flight engineers on the B-29 Superfortress, for colleges, private enterprises, an airline and the Army.

The Shops

The repair and overhaul shops will be the most completely equipped in the region. All makes of planes will be serviced; the shop is now the only company-authorized repair depot west of Wichita for the Culver Cadet and holds company authorizations from other manufacturers as well. Chief mechanic is Richard Snyder, who operated his own successful shops before the Sky Ranch was built and who has had many hours of experience on nearly every make of plane.

The Management

President of Aero Enterprises, Inc., which owns and operates Sky Ranch Airport, is L. W. Mack, Sr., for over forty years a prominent business man. L. W. Mack, Jr., a former airline pilot, is executive vice president.

The Company Policy

Do not expect high prices at the Sky Ranch Airport because of the extensive facilities. Present prices are at or below accepted levels and they will be reduced as rapidly as volume and other conditions make it possible. Cheerful, prompt service for the air traveler and his plane is the motto of Aero Enterprises. Any kind of repair, overhaul or check will be made as rapidly as possible and, as soon as the end of the emergency makes it possible, the air traveler will find sleeping quarters, food, recreation or transportation to downtown Denver available. All services and facilities available at one location provide one-stop service, with the personal pilot holding first priority. All aircraft repair or alteration is made under the supervision of experienced A & E mechanics. All flight school equipment is kept in A-1 condition at all times. The entire operation is under the supervision of a former CAB Air Safety Investigator. ★ ★ ★

Steers Opposes Federal Flight Strip Plan as "Bait" for Road Funds

Timely comment on the proposed amendment and supplement to the Federal-Aid Road Act, S-2105 and HR-4915, has been received from Sheldon B. Steers, director of the Michigan Board of Aeronautics. His opinions reflect the attitude of state aviation officials in general. Steers says, in part:

"Section 11 is so written as to allow the Commissioner of Public Roads, in conjunction with the State Highway Department or any federal agency, to construct flight strips without the necessity of consultation with CAA or state aviation agencies charged with supervision of the design, layout, location and construction of airports. I understand this has now been amended to require CAA approval of locations, but it still doesn't give the state aeronautics commissions any cooperation.

"The excuse used in that section to build these strips is in a sense ambiguous, for it states 'in order to insure greater safety for traffic on the public highways by providing additional facilities to be available for the landing and taking off of aircraft.' This seems to presuppose that aircraft are going to be landing and taking off of highways. Our present laws and regulations make it illegal because we believe, and the federal government seems to concur, that the practice is particularly hazardous from more than one point of view. It seems extraneous to have any regulations on the books prohibiting this practice, and yet now to recognize officially that that probably will be done.

"The section further prohibits the expenditure of federal highway funds on access highways and roads to airports and flight strips unless the officials in charge have first concurred. It seems to me that if the Public Roads Administration is so airminded as to want to build flight strips, they would go whole hog for the building and improvement of access roads to and from airports. There have been many instances where highway officials were not of a mind to be bothered with access roads to airports, even though the airport people cried their eyes out. . . .

"Section 11 further states that these strips may be built 'when requested by the State Highway Department.' . . . Some states are so highwayminded that they will spend every dollar of their allotment strictly for highway construction, thereby leaving the aviation interests holding the bag.

Interest in Flying Questioned

"It appears to me that the flight strip idea has been incorporated in this highway bill for the purpose of justifying the need for the $1,950,000,000, and Section 11 is so drafted that probably a very small portion of that amount will ever get into flight strips unless most highway departments are more airminded than I think they are. We in aviation are desirous of having money made available for airport construction, but I think most of us are aware that the Congress will curtail any appropriation for airport construction, should this bill pass, on the assumption that aviation will have benefited considerably under the highway program.

"Personally I have never been fussy as to who built the landing facilities or where the money came from, and this is no exception. But if landing facilities are a legitimate part of the highway program there must be some requirement to assure that the facilities will actually be built and placed where they would be of some value.

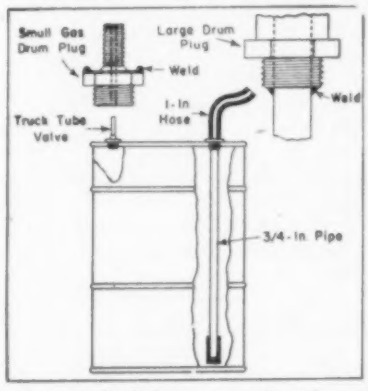
"Aviation interests resent the Public Roads Administration mixing into the airport construction business about as much as the roads and highway people would resent aviation dabbling in their particular field. I believe there is a happy medium for all parties concerned and that they must work together, but I don't believe that either should attempt to carry out the functions of the other.

"At the present time the Civil Aeronautics Board is placing an interpretation upon Section 408 of the Civil Aeronautics Act of 1938 excluding the surface carriers from the air carrier field, their reason being that surface carriers would probably stifle the advancement of aviation. If such reasoning is just, then why isn't it reasonable to believe that a similar construction could be placed on the entrance of the highway people into the aviation field? I realize their interests, first are with the highways, and it is hard for me to believe they have become so airminded that they now want to do aviation favors. I am more inclined to think the flight strip section is 'bait' to increase the public roads appropriation. . . .

"From a broad view, it seems to me that any program which presupposes to aid and assist aviation through construction of landing facilities must by all means be so drafted as to assure the aviation interests in all states that these facilities will be constructed. I am thinking now particularly of the mountainous states where highway and landing field construction is very expensive and therefore the bulk, if not all, of the state allotment under this proposal would be apt to go into highway construction."

Drum Fueling System Uses Compressed Air

Attachments to a 55-gallon fuel drum have been devised—which make refueling operations by compressed air feasible. Equipment which is hard to refuel by conventional methods can be easily refueled by this improvised pump.



The accompanying drawing from "The Maintenance Engineer" gives details of construction and shows the necessary attachments for converting a 55-gallon fuel drum into a labor-saving refueling device. A word of caution: Use only enough pressure to establish a satisfactory flow of fuel.

Landing Strip on Every Ranch Is Goal of Texas Flying Club

The Southwest Texas and International flying club has been organized at Del Rio, Texas, by business and ranch men who believe the airplane can be used to an advantage in operating their businesses. The purpose of the club is to promote private flying in general and to secure a port of entry to Mexico through Del Rio. The members have postwar plans for landing strips on every ranch, some of the strips having already been constructed. The Municipal Airport at Del Rio has been designated and the flying school there has enrolled more than one hundred students in the last five months.

Airport Construction

Construction awards by the Chief of Army Engineers announced last month by the War Department included:

OAKLAND, CALIF. — American Electric Construction Co., San Francisco, Calif., to construct extension to night lighting system at the Oakland Municipal Airport at an estimated cost of $38,876.10.

OKLAHOMA CITY, OKLA.—Rockwood Sprinkler Co., New Orleans, La., to construct automatic sprinkling system at Tinker Field. The cost is estimated to be $194,243.00.

MONTGOMERY, ALA. — Wright Constructing Co., Columbus, Ga., for grading, paving and drainage work at Maxwell Field at a cost of $355,480.95.

OAKLAND, CALIF. — Piazza & Huntley, San Jose, Calif., to construct runway at the Oakland Municipal Airport at an estimated cost of $389,953.00.

OGDEN, UTAH.—Chytraus Construction Co., Salt Lake City, Utah, for reconstruction of concrete aprons at Ogden Arsenal at a cost of $47,629.23.

. . . With His Aeronca Program For A Small Airport!

"Anyone can *build* an airport", Joe told the City Fathers, "but here in Centerville we want our airport to be a *paying proposition!* I've given a lot of thought and study to this problem, and I'm convinced that *Aeronca* has the answers. The Aeronca program is based on 16 years of leadership in the personal plane business, and includes lessons learned by scores of successful Aeronca airplane dealers operating from small airports."

No wonder the Council unanimously agreed when Joe concluded, "I think we ought to get *all the facts* from Aeronca right now!"

Plan—today—to make the small airport in *your* community a profit-maker. Find out about Aeronca's *complete program.* Fill out and mail the coupon without delay, and lay the foundation for *your* success in post-war aviation!

Small Airports Can Pay! Get These Important Books Now!

AMERICA'S PERSONAL PLANE

AERONCA

AIRCRAFT CORPORATION

MIDDLETOWN, OHIO

Al Bennett, Director of Sales,
Aeronca Aircraft Corporation, Middletown, O.

Please send me the illustrated booklets checked below. I enclose 10c for each booklet.

☐ "HOW TO MAKE SMALL AIRPORTS PAY WITH AERONCA"
☐ "WHY YOU SHOULD BE AN AERONCA DEALER"

Name.....

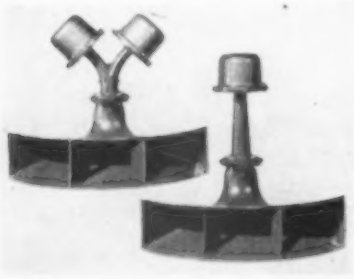
Address.....

City and State..... D-12

AIRPORT EQUIPMENT

New Type Speaker of Cast Aluminum

A new type loudspeaker has been announced by the Langevin Company, designed to operate with maximum intelligibility through noise levels and



using uniform distribution over horizontal angles of 120 and vertical of 40 degrees. The unit was designed for voice reproduction when used alone, or as an excellent high frequency component to a wide range system. Made of one-cast aluminum, equipped with heavy universal mounting brackets, the loudspeaker handles power input of forty watts when equipped with two Jensen U-20 drive units. It is twenty-two inches wide, fourteen and one-half inches deep and twenty inches high.

Shock Ring Jimmy for Cubs, Taylorcrafts

A new means for installation of shock rings on Piper Cubs and Taylorcrafts, produced for use by A&E mechanics and maintenance men, has been developed by the LaPointe Engineering Company. Called the LaPointe Shock Ring Jimmy, the new device is a curved steel bar with a swivel head fitting the end of the retaining arm on the shock strut. One end of the bar is slipped through the shock ring, with the head on the other end which is to be fitted to the retaining arm, then the end of the bar is drawn up and over the strut. The shock ring slides down the handle, over the head and is in place.

Portable Air Supply

A portable air supply has been offered by the Scott Aviation Corp., enabling the user to carry air to the plane for inflating tires, instead of moving the plane to the airhose. Planes with wheel pants can be serviced in the same amount of time as without. Weighing twenty-four lbs., the Handi-Air unit holds enough air for eight light plane tires. A gauge indicates the air pressure remaining in the tank. It is available now from any Scott dealer or the Scott Aviation Corporation.

Pulsating Light System Measures Cloud Ceiling

Daylight reading of cloud ceilings by use of a pulsating light system with a photoelectric detector has been made possible by a new development of L. W. Foskett, U. S. Weather Bureau, and General Electric engineers. The new device consists of a mercury arc projector, a pickup unit, called ceilometer, and a recorder, which provides continuous recording of ceiling height and relative cloud density.

A tiny super-high-intensity quartz mercury lamp is mounted at the focus point of a searchlight mirror to throw a 120 cycles-per-second pulsating beam vertically into the sky. The beam, not visible to the human eye in daylight, is scanned readily by the ceilometer. This unit consists of a phototube pickup and amplifier feeding to an output meter. It is located 1,000 feet from the projector; tuned to the same frequency as the light pulse in order to distinguish the mercury light from background light.

Tire Remover Devised by Hangar Chief

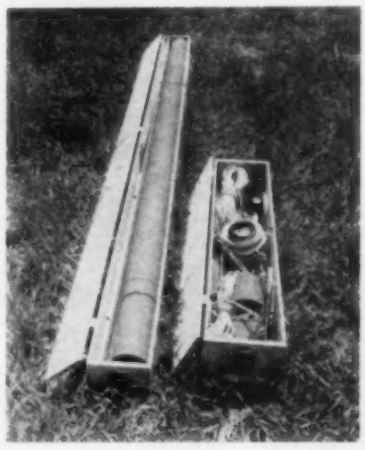
A tire remover has been designed by William C. Holecek, hangar chief at Hawthorne School of Aeronautics, Orangeburg, S. C. Made of scrap metal and a small hydraulic jack, the gadget breaks casing loose from wheel hubs in a matter of seconds as compared to minutes of hard pounding previously required to remove a tire. The device consists of three major

components; a four-legged standard, made from scrap tubing; four vertical pipes through which the wheel is dropped, and a top plate.

Pressure from several pumps on the jack exerts downward on the push ring which breaks the tire casing free from the wheel. Repeated on the other side, the tire is removed.

Tubular Antenna Mast Made of Plywood

A tubular plywood mast for directive antennae has been developed by the Plymold Corporation. Of portable type, telescopic, lightweight, the tubular plywood antenna is being manu-



factured in a variety of models in all frequency bands. Heights to ninety feet are available on order, while standard heights of fifty feet, fifty-five feet, and seventy-five feet are carried in stock. All masts are designed in sections not exceeding twelve feet in length to facilitate shipment and erection.

Steel Mast Catalogue

A new line of masts and towers has been announced by the Harco Steel Construction Co., Inc. A new catalogue will be sent to executives and engineers upon request, describing the new line which lists ten different types of towers and masts, for use under varied conditions with all types of labor. There are complete specifications, construction details and illustrations of each type.

Mobile Floodlights

A self-powered mobile airport floodlight has been developed by Westinghouse, which is said to be the world's most powerful floodlight. Fitted with four 3,000-watt airport floodlights, the unit will illuminate a mile-long landing strip, company officials stated. Now being assembled by the Davey Compressor Company, the equipment is mounted on a truck and through power take-off application the motor drives a compact generator to power the four lights. Aside from an airport landing light the power can be used to supply emergency power for control towers, stationary landing strip lights or for operating small power tools.

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CAA Figures Show Only 714 Airports with Private Hangars, 1,778 with Commercial Hangars in U. S.

Civil Aeronautics Administration statistics show marked shortages in hangars and other airport buildings as of September 30, only 714 of the nation's 3,265 airports possessing private hangars and only 1,778 airports having commercial hangars.

Only 638 airports have administration buildings. Two hundred and fifty have their offices located in hangars, and at 825 airports there is only a small office building.

Shops at 985 Fields

Repair facilities are located at 985 airports, 528 have both major aircraft and major engine repair shops, while 381 have both minor aircraft and minor engine repair facilities (five have minor aircraft only, six minor engine only, five major aircraft only and three major engine only). Twelve have minor aircraft and major engine facilities, and forty-four have minor engine and major aircraft repair facilities. Only one has major aircraft, major engine and other (instruments, etc.) repair facilities.

The distribution of airplane hangars is as follows:

Private hangars — 425 have one, 129 have two, 53 have three, 30 have four, 25 have five, 12 have six, 9 have seven, 4 have eight, 8 have nine, and 19 airports have ten or more private hangars.

Commercial hangars — 982 have one, 398 have two, 168 have three, 94 have four, 53 have five, 37 have six, 13 have seven, 10 have eight, 12 have nine and 11 have ten or more.

New Runway and Other Improvements Going in At Oakland Municipal

Construction of a new 6,900-ft. runway parallel to but separated by 1,000 feet from the existing east-west runway, is one of several improvement projects now under way at the Oakland, Calif., Municipal Airport. The work, costing a total of about $5,000,000, includes lengthening and strengthening of two main runways, filling in of approximately 118 acres, elimination of a street, construction of a new levee on the south, and other improvements.

Hawthorne Improves Columbia, S. C., Facilities

Hawthorne Flying Service, operator of the Columbia, S. C., Municipal Airport, has completed extensive improvements to its facilities in the municipal hangar.

Major improvement has been the addition of a pilots' lounge 50 ft. by 25 ft. in dimension. A cracked red tile floor, leather easy chairs and divans, curtains, rubber plants and fluorescent lighting have made this lounge a show-place. The room also combines a display case for sales of aeronautical accessories and a desk for the reception clerk. A glass-enclosed office in one corner for the Flight Director, Claude Rinehardt, and glass-windowed office on the other side for Manager Walter Phipps make it possible for one or both officials to note the arrival of visitors and personally greet them.

The pilots' ready room has also been completely redecorated with a large number of attractive photographic murals and long built-in, well-upholstered settees. One wall is panelled with regional charts of the entire east half of the United States.

Other improvements have included complete painting of the hangar and premises and the installation of public address and interphone systems for speedier transaction of gas sales and other business.

Civilian Flying Resumed At St. Louis Municipal

Another index to clearing skies for private flying was the decision of St. Louis' airport manager, John Randolph, to permit resumption of non-scheduled flying activities, including student instruction, on Lambert Field. With the discontinuance of the Navy primary flight training program which utilizes some 185 trainers, Randolph sees no traffic hazards from non-scheduled operations for a long time to come. He pointed out that none of the Navy trainers had radio, that little trouble developed between the Navy's twenty-four - hour - per - day "merry-go-round" flying and scheduled operations.

St. Louis took another step last month as a gesture to non-scheduled aviation by ordering temporary restoration of the old airfield in Forest Park so that delegates to the National Aviation Trades Association convention December 5-9 could use it as a landing strip.

Additional Funds Granted To Expand Airport Courses At University of Tennessee

Initial success of courses at the University of Tennessee in airport and airline operation and management, and aviation development in the state's airport development laboratory, has led the Tennessee Bureau of Aeronautics to grant additional funds for their continuance and new funds to set up an "aviation center" to house the University activities. Twenty students are now taking the courses and include several discharged soldiers.

An enrollment of 100 or more is expected in the fall of 1945, and to continue the instruction through June the Bureau has designated an additional grant of $1,000 a month for the laboratory and educational program, and has allocated $5,000 for housing. It is proposed to use several temporary buildings purchased from the Tennessee Valley Authority. They will be remodeled pending construction of a permanent aviation center on the campus, located at Knoxville.

Member Campaign for Airport Executives

The American Association of Airport Executives is intensifying efforts to obtain members at small airports, according to Pat Moore, secretary-treasurer. In the past its membership has consisted chiefly or airport executives of the larger airports. Growing developments in airports and airport management have broadened the Association's field of activities, however, and expansion of its services to provide for smaller airport memberships has met with much success in many sections of the country. Full information may be obtained from Moore at the Association's headquarters, P. O. Box 734, Peoria, Ill.

CAP Survey Finds 1,592 Airports Open to Civilians; 189 Built or Improved by CAP, Which Operates 215

A Civil Air Patrol questionnaire in which all forty-eight state Wing Commanders surveyed airports in their respective states shows 1,592 airports now open for civilian flying, with 215 in thirty-one states owned, operated or managed by CAP units.

Eighty-one airports in twenty-two states were constructed by Civil Air Patrol. Others are under construction. Four hundred and three others in forty states would have been closed during the war had it not been for CAP help and patronage, and in addition to the number CAP constructed, it made major improvements to 108 airports in twenty-eight states.

Airports now open for civilian flying, as tabulated by CAP, are distributed as follows: Alabama 20, Arizona 14, Arkansas 28, California 35, Colorado 38, Connecticut 9, Delaware 1, Florida 31, Georgia 21, Idaho 19, Illinois 72, Indiana 40, Iowa 40, Kansas 58, Kentucky 12, Louisiana 11, Maine 12, Maryland 11, Massachusetts 28, Michigan 145, Minnesota 32, Mississippi 21, Missouri 35, Montana 16, Nebraska 36, Nevada 11, New Hampshire 15, New Jersey 8, New Mexico 23, New York 74, North Carolina 35, North Dakota 9, Ohio 74, Oklahoma 48, Oregon 10, Pennsylvania 132, Rhode Island 1, South Carolina 21, South Dakota 8, Tennessee 42, Texas 120, Utah 16, Vermont 12, Virginia 48, Washington 20, West Virginia 16, Wisconsin 32, Wyoming 32.

Current Airport Literature

Compiled and Edited
By WILLARD KELSO DENNIS

(EDITOR'S NOTE: This bibliography by the well-known librarian of Parks Air College appears every month for the reliable guidance of MODERN AIRPORTS' readers. Inquiries regarding his complete aeronautical bibliography will be forwarded to him.)

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Adequate landing and servicing facilities essential for expansion of private flying. *Aviation Maintenance*. 2:44. Oct. 1944.

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Wichita airpark plan. *Commercial Aviation*. 6:73-74, 76. Oct. 1944.

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Data on Canadian port outlay revealed. *Aviation News*. 2:20. Nov. 13, 1944.

AIRPORTS—GREAT BRITAIN—BLACKPOOL

Blackpool's trans-ocean airport scheme. *Aeroplane*. 67:330-331. Sept. 22, 1944.

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Latin American port program rivals U. S. *Aviation News*. 2:46. Oct. 30, 1944.

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Designated landing area supplements. *Southern Flight, Modern Airports*. 22:72. Nov. 1944.

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Baltimore planning new, larger airport. *American Aviation*. 8:45. Nov. 1, 1944.

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Conference spurs Georgia action, by M. F. Baldwin. *Southern Flight, Modern Airports*. 22:58-59. Nov. 1944.

AIRPORTS—U. S.—HOUSTON

Revenue vs. costs at Houston Municipal. *Southern Flight, Modern Airports*. 22:52. Nov. 1944.

AIRPORTS—U. S.—INDIANAPOLIS (SHANK)

Shank airpark to use natural advantages. *Aviation News*. 2:25. Nov. 6, 1944.

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Air harbors urged for N. Y. waterfront. *Aviation News*. 2:20. Oct. 23, 1944.

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Local capital for airports urged as means to avoid bureaucracy. *American Aviation*. 8:30. Nov. 1, 1944.

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Federal works agency takes hand in post-war port planning, by Blaine Stubblefield. *Aviation News*. 2:27-28. Nov. 13, 1944.

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AIRPORTS—LEASES

Division of operations from management for small towns urged at Southwestern Aviation Conference. *Southern Flight, Modern Airports*. 22:70. Nov. 1944.

Here's one airport contract that satisfies both parties. *Southern Flight, Modern Airports*. 22:51. Nov. 1944.

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Stress accessibility in port location. *Aviation News*. 2:39. Oct. 23, 1944.

AIRPORTS—MAINTENANCE AND REPAIR

Some advantages of state control of airport maintenance, by D. C. Martin. *Aero Digest*. 47:54-55. Oct. 15, 1944.

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Airline commentary. *American Aviation*. 8:60. Nov. 1, 1944.

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Information, please, by J. H. Gray. *Southern Flight, Modern Airports*. 22:62, 64. Nov. 1944.

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Washington Airport revenues up sharply. *Aviation News*. 2:40. Oct. 23, 1944.

Who'll operate our municipal airports? by W. D. Strohmeier. *Air Facts*. 7:74-80. Nov. 1944.

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Air harbors urged for N. Y. waterfront. *Aviation News*. 2:20. Oct. 23, 1944.

Australia's inland flying-boat base. *Flight*. 46:a-397. Oct. 12, 1944.

Skyports for Manhattan get Trade Board's endorsement. *Air Transportation*. 5:54-55. Oct. 1944.

AIRPORTS—PLANNING

Asks local C. of C.'s to back port plans, by Scholar Bangs. *Aviation News*. 2:10. Oct. 30, 1944.

Small airport needs. *Southern Flight, Modern Airports*. 22:60, 68. Nov. 1944.

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Alcoa develops landing mats half the weight of older steel ones. *Air Transportation*. 5:40-41. Oct. 1944.

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Local facilities for national progress, by J. H. Frederick. *Southern Flight, Modern Airports*. 22:50-51. Nov. 1944.

HANGARS—CONSTRUCTION

Portable hangars for Navy aircraft. *Modern Plastics*. 22:109-110. Nov. 1944.

LIGHTING, AIRPORT

"This way to the airport" light. *Air Line Pilot*. 13:5. May 1944.

Salt Water for Soil Stabilization Studied for War in Pacific

A report from our many battlefronts, possibly the Southwest Pacific, led to laboratory tests of the relative merits of the use of salt water in the soil-cement processes of soil stabilization. The initial report listed an apparently higher strength that was obtained from using water from the ocean.

The results obtained in the laboratory show that whereas the early strengths of salt water mixes are higher than that of fresh water mixes, the relative compressive strength starts falling off after the first fourteen days of curing time.

The tests were made from sandy loam, sandy clay loam, and clay loam. And whereas the relative compressive strengths have been determined, the test data are not sufficient to determine the effects of other variables such as density, mixture content, curing and testing.

No durability tests have as yet been conducted, hence it remains unknown whether soil-cement made with fresh water is more durable than that conducted with salt water.

FIRST IN THE FIELD FOR POSTWAR PERSONAL AIRCRAFT

FIRST—as always—in progressive aircraft development, General Tire has modified fighter craft equipment to bring you the Unitized Tire-Brake-Wheel—designed for the Postwar Personal Plane. The General Unitized Wheel gives you not only factory-assembled tire-brake-wheel units for installation but also balanced, *matched wheel sets* including landing wheels, tail wheel or nose wheel . . . engineered as a unit.

Lighter weight and greater safety and durability have been stress-engineered into General Unitized Wheels by utilizing the finest, strongest materials known to tire and wheel science at highest, safe stresses. The result is safer, more durable components—true to General's Top-Quality standards—engineered into balanced tire-brake-wheel sets for popular priced, postwar planes.

Out of General Tire's full-time concentration on developing and producing vitally needed improvements in wartime aircraft has come this Unitized Wheel, *ready now* to fit your new plane designs or service present planes. Write or wire for General's Unitized Tire-Brake-Wheel specifications or engineering assistance.

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THE Sky's the Limit

BY BILL GREEN

America at work. . . . New developments in airplanes inspire faith in the future. . . . Some gadgets are incredible until you see them. . . . It all adds up to finer lightplanes.

AS far as we are concerned ye Editor can write the title for this one. We once took a course in writing the English Language (some people will wonder about this) and the prof told us we should be very careful to limit the title to something that we could cover completely. Well, there isn't any title we know of that anyone can tell the whole story about. Thus you will know that we couldn't express ourselves to our complete satisfaction except by using a title that covers too much ground. The one we had in mind was: This America.

We have been looking around quite a bit lately. There are lots of things to look at and wonder about. We are constantly amazed at America — and Americans. They can't be beaten. After umteen years of new dealism, communism, too-damned-high taxes, war, sabotage, hitch-hikers, international immorality, Ickes, WPA and the PAC, there are still a lot of Americans who are working away, enjoying that traditional American privilege of private enterprise and effort. Following are a few of the products, as far as aviation is concerned.

One very impressive aviation concern has built, flown and experimented with a one-man airplane for postwar. It does eighty cruising, with a diminutive engine; climbs like a homesick angel; and when you get tired of flying it you can pull the throttle, massage your stomach with the stick, and descend at half the rate of a parachute. That would permit you, in an emergency, to set it in the top of a tree, on a rock pile, in a canyon, on your front yard, without injury to yourself. They intend to trade it to you for a thousand dollar bill—and hand you back a little change. Such a gadget will be pretty useful. (Few people realize that most small airplanes are really one-man planes — if you want to carry two people you are not allowed baggage, full gas tanks, starter, radio equipment, etc. The CAA could have arrested many pilots for flying overloaded in small airplanes).

One airplane company is not worried about anything except their interiors (that's what they said, anyway). They intend to advertise mostly about the comfort and luxury of their cabin interiors. Well, another amazing thing is that most people don't know how fast their airplane will go. They are satisfied that it is an airplane. If anyone attacks the extravagant claims of the salesman who sold it to them, they are the first ones to defend the alleged airplane. Thus, perhaps these people will sell lots of their product.

Before we forget it, that 3-place, "85-hp." airplane our last month's column described as having 200-mph. top speed was a typographical error. It is actually a 185-hp. airplane.

A friend of ours (as previously reported in this column) has been making some gadgets for a long time that are not advertised but which will be available for postwar airplanes. One of these is a small, light, inexpensive automatic pilot for small or private airplanes. We have seen the thing, have watched it fly the airplane, and it does a wonderful job. This gadget is simple, foolproof, and accurate. It doesn't drift as badly as some of the higher-priced models. It will return to its original course in spite of sudden gusts, or even intentional sudden ninety-degree turns. This thing will be a great help to those pilots who get tired of piloting — who want to take a nap, read the paper, look at their maps, tie their shoes, work on the radio, pat their girl friends or rummage in the baggage compartment. It would also be a help if you wanted to jump out and not have the ship plow into you about half way down.

Sounds Good — Is Good

This same bird has made a somewhat similar contrivance that will instantly compensate a twin-engine airplane if one engine quits. Air pressure on the rudder does the work.

Another gadget will indicate approach of a stall—ring a bell, indicate on a dial, or even adjust the elevators to correct the condition. It would pay some philanthropist to put them on all training airplanes (and a lot of others, too).

There is also a composite aircraft instrument panel in which all instruments operate on concentric shafts, and are adjusted so that in normal, level flight, they all line up, one on top of the other. This makes it necessary to watch only one dial, instead of ten or twelve.

A lot of very sensitive, and powerful little gadgets have been developed to operate from differential air pressures. Some of these are light, cheap, and so sensitive and dependable that we expect them to revolutionize some of our control problems.

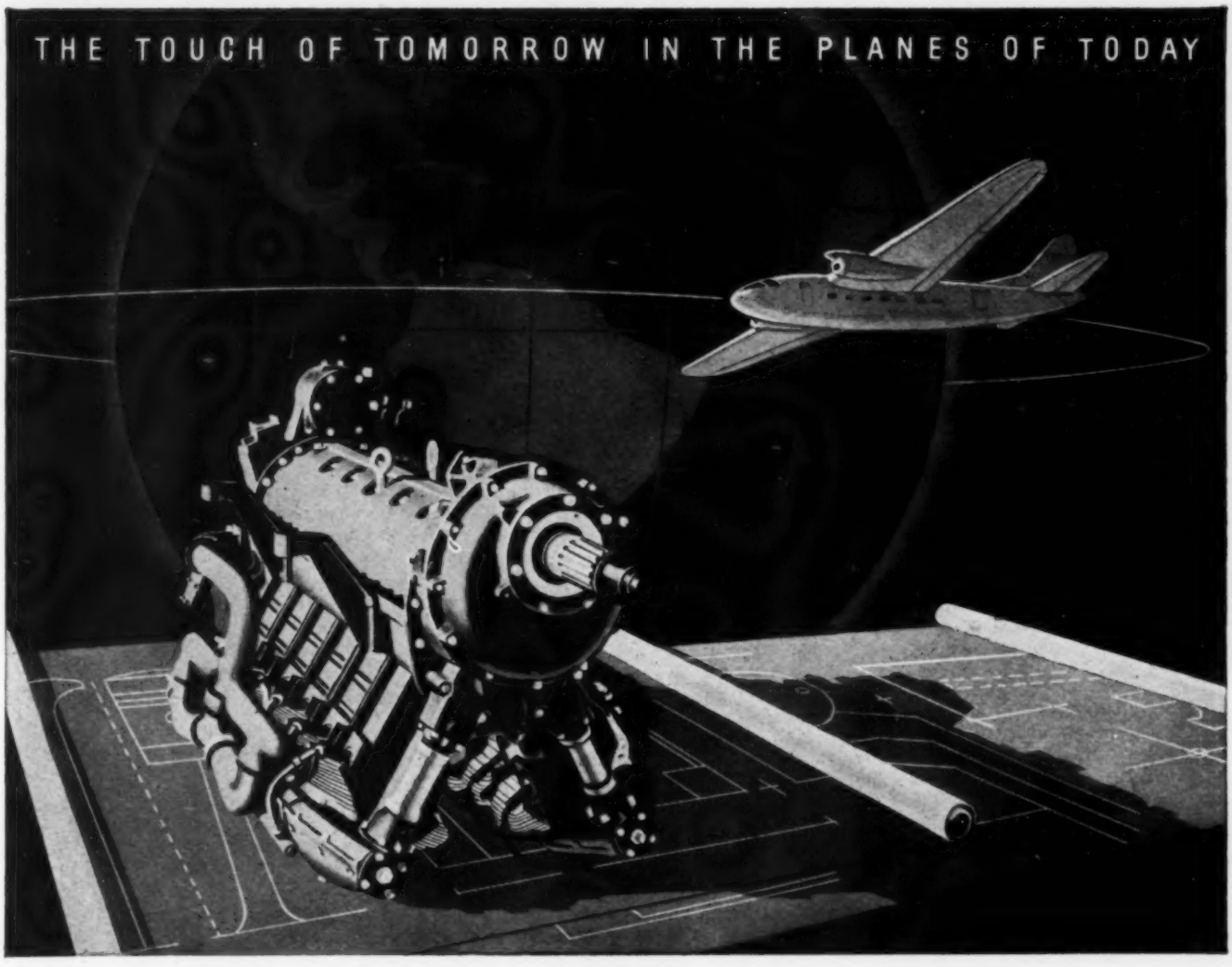
There are a number of compasses that eliminate the inaccuracies due to iron, steel, and electrical circuits in airplanes. This little problem has long served as the alibi for a lot of birds who get lost. Wonder what they will do after this?

One outfit is supposed to have a device that will enable you to maintain an altitude of a few feet above the ground—if wires get in the way it will tell you and you pull up over them. We have not seen much indication of the success of this gadget yet, as some of our best pilots continue to knock down highlines. Maybe their number just came up.

Another company suggests the notion of blind landing facilities for everyone — cheap, accurate and dependable. Antennae would radiate a mile or two from the end of each runway, enabling one to line up with the proper runway, and having markers at such intervals as to permit proper descent for landing.

Be all this as it may, we still like to see the ground when we are flying. It seems to work best that way, although a friend, now dead, once said that he preferred to fly over clouds or through fog rather than to look down on the Big Swamp, or the Rockies. Many feel safer when they refuse to look the facts in the face. Anyway, as we have said before, it is going to be plenty interesting around here for many years after the war as all these developments finally find their way onto the new airplanes.

One gloomy prediction: Authorities don't expect jet-propelled lightplanes to be very economical. Seems that below speed of 300 mph. they consume too much fuel. Best speed for them seems to be 500 plus. Above that they beat conventional engines and props all hollow. Some companies have war-



RESEARCH PAYS a 30,000 Mile Bonus

Clean cut and durable as a gem, Ranger engines deliver their dynamic punch under the toughest year-'round flying assignment in the book.

Normally, engines in service are "pulled" for major overhaul after 600 hours. But Rangers have consistently paid a service "bonus" up to 50 per cent. It's common for a Ranger engine to reach the ***900-hour*** check point, purring sweetly, delivering full power . . . 30,000 and more ***extra*** miles of flight.

Ranger-powered planes cut through the rugged cold of Canada, the dust-laden heat of deserts; they fly in Mexico, throughout South America—and in South Africa. They do their flight job, sturdily, under all sorts of field conditions.

The twelve cylinder Ranger, for example—aircooled for weight economy, inverted for a better field of vision, inline for better streamlining—logs hours and hours of time in rigorous wartime operations. Yet Rangers continue to pay a bonus—hundreds and hundreds of ***extra*** hours in the air.

In use only on military planes today, Ranger engines on commercial airline and private planes tomorrow will provide those extra hours of service for efficient and economical operation.

Fairchild research—the constant quest for better materials, better methods, better results—has made this Ranger bonus possible. It springs from Fairchild engineering knowledge and experience that lends the "touch of tomorrow to the planes of today".

BUY U. S. WAR BONDS AND STAMPS

RANGER AIRCRAFT ENGINES

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craft that far exceed those figures. However, we may be just as well off with the new engines and props. Lots of new controllable and constant speed props for little airplanes will be available. These improve the performances immeasurably. They will be a real thrill after the way some of these underpowered clunkers have performed.

★ ★ ★

Thinking Out Loud

We have noticed quite a tendency among the airline companies to try to gobble up feeder lines for themselves. Such greediness should not be permitted. We believe the public interest will best be served by permitting as many persons or companies to operate as is possible.

Consider the taxicab business as an example. If the Yellow Cab company were the only cab company permitted to operate there would be a lot of places without cab service. Suppose the Government permitted only the Yellow, Checker and Nichols Cabs to operate in the U. S.—there would still be lots of cities without cab service. Many a small company can render a useful service with the means at hand, whereas a large outfit can't operate on the small volume available in many places. Permitting a few outfits to gobble up the areas or routes is going to mean a lot of places will be left without service. What is equally important to us, many individuals will be deprived of the right to engage in their own private enterprise.

Incidentally, the same equipment will not serve equally well in every case. There are lots of advantages to private enterprise—small private enterprise—performing many of our services.

Recently we noted that one airline is trying to grab up all the routes that can be imagined in Oklahoma. Undoubtedly many of them would never be operated—thus depriving others of the chance to set up such service.

We decry, and loudly too, the attitude of the CAB with reference to the setting up of new routes and feeder lines by small companies. Since when do Americans need to be told by some government bureau that such and such a route could not pay off? How does the CAB know? We think it is only another example of government interference—of assumption of authority beyond legal limitations. We know full well that if some of these routes do not pay off, the operators will take some steps that will make them pay. The CAB's contention that routes between Podunk and Jonesboro do not have paying possibility is based on pure conjecture. Go and see if you can get a bus seat between those two places—or any two places anywhere.

Some years ago railroads hauled all freight in the U. S. except water borne freight. People said trucks couldn't compete with railroads. Today thousands of railroad stations have been abandoned—and the busses and trucks haul most short haul freight, express and passengers. Some of this short haul passenger, freight and express business is urgent—in a hurry. It will pay extra to go by air. Many small places in South America have air passenger, freight, mail and express service. We are entitled to them, too. We hope the CAB will come to life and let progress advance.

Many people are looking down their noses at the CAB-CAA setup. After preaching safety for so many years they have sold, on an "as is" basis, a lot of WTS airplanes, many of which were dangerous crates long since worn out. These ships—sold at high prices—are going to kill some people and in addition will drug the market. Many innocent purchasers will be forever soured on aviation. A man who purchases a junk airplane and intends to use it for business purposes is going to take a beating. We know—we've tried it—and so have some of our friends. The RFC is now doing the selling, but it is still on "as is" basis.

Incidentally, nothing is so sad as a bureaucrat making a speech about something he had nothing to do with and knows very little about—almost makes us decide not to go to any more aviation clinics or meetings. If it were not for a lot of good fellows being there we wouldn't go.

We earnestly hope the CAA will renovate its skeptical attitude about new instruments and devices for aircraft. It is—and has been—so difficult to obtain ATC's on aircraft equipment and accessories that lots of useful gadgets and some aircraft are never ATC'd. We know of instances where manufacturers—once an ATC is obtained—will not improve their equipment because of the difficulties obtaining ATC's.

We do not believe that the CAA should act to retard aviation development. But, we believe it sometimes has and does. As a paid servant of the people it should make all efforts to be helpful and to encourage any new device offered to the market. Only in this manner can we expect maximum development in the shortest space of time.

★ ★ ★

Postwar Planning

Here are a few lines from "Yank" worth passing on:

THE RECONVERSION

When bugles sound their final notes
And bombs explode no more
And we return to what we did
Before we went to war,
The sudden shift of status
On the ladder of success
Will make some worthy gentlemen
Feel like an awful mess.

Just think of some poor captain
Minus all his silver bars
Standing up behind some counter
Selling peanuts and cigars;
And think of all the majors
When their oak leaf's far behind
And the uniform they're wearing
Is the Western Union kind.

Shed a tear for some poor colonel
If he doesn't feel himself;
Jerking sodas isn't easy
When your eagle's on the shelf.
'Tis a bitter pill to swallow.
'Tis a matter for despair;
Being messengers and clerks again's
A mighty cross to bear.

So be kind to working people
That you meet where'er you go,
For the guy who's washing dishes
May have been your old CO.
—Pfc. Edward Blumenthal

"Mr. Squier is restless again today, I see . . . always led a very active life, y'know!"

ELECTRICALLY OPERATED *ACTUATORS*

Air Associates Electric Actuators, available in all sizes, are designed and engineered for maximum service.

Each has a lightweight motor with built-in clutch and brake—and a torque limiting clutch where required . . . spur gear reduction to high efficiency screw jack . . . hardened steel screw with special thread form and high strength nut of bronze alloy . . . positive stops at each end of screw to control travel . . . built-in limit switches, easily adjustable from outside. Actuator shown weighs under 5 lbs., is suitable for working loads of 1,500 lbs. and static loads of 2,000 lbs. . . . *Your requirements promptly filled through any Air Associates office.*

•AIR ASSOCIATES, INC.

TETERBORO, N. J. . . . *BRANCHES:* CHICAGO, DALLAS, LOS ANGELES . . . ENGINEERS & MANUFACTURERS OF AIRCRAFT SPECIALTIES . . . SUPPLIERS OF ALL TYPES OF MATERIALS TO THE INDUSTRY SINCE 1927

SMALL BUT PROFITABLE

(Continued from page 31)

that we much prefer five hours of charter to five hours of instruction. We are planning to add other pilots to our staff after the war. It is our thought to pay them on a base pay basis plus hourly pay.

Although we have occasional call for our five-place airplane during the football season, or for conventions, the cost is too great for our small business men to charter. We have operated Wacos, Beechcrafts, Lockheeds, Ryans, Stinsons, and Cessnas over a period of years, and have found them all to be good airplanes. But for charter work to please our small business men, the light plane is assuredly the answer. It may be a little slower, and occasionally we lose a passenger who wants to fly in a bigger airplane, but we far more than make up for this loss through saving in operating cost for the many flights we do make.

As an adjunct to the regular charter service, we offer a rental plane service. This we apply only to known competent pilots for cross country trips at $8 per hour. First, however, we check the weather *and* the pilot. We prefer to lose business rather than lose an airplane. We have only land damage insurance, preferring to carry our crash insurance.

This feature of emphasizing safety is a *must* to our way of thinking. It applies not only to the actual damage done to one of our planes, but to the public acceptance of an industry upon which we depend for a livelihood. With the end of the war there will be many more trained pilots than before. Many of them will want to rent a plane on occasion, and we expect that there will be money to be made from this business. But if they are not properly guided by operators and by the CAA, so that they will not be taking the girl friend up for a ride and demonstrating how they dove on a Jap Zero, thereby shedding the wings on the little light plane, then the whole public will go sour on the aviation business as a result of the series of unnecessary crashes that will fill the headlines.

Personally, we're in favor of sudden and drastic action by the operators and the CAA whenever such a stunt is pulled. Let's keep this business safe. Our firm has spent a good many years building up aviation in this community, and the same applies to operators in other communities. We have stressed the safety of flight, and it won't do for the operators and the CAA to let a few scatter-brained pilots tear down the result of these years of careful planning.

That may be off the beam of telling about our charter operations, but it has to do with the reason we're struggling along now. To get back to our subject, we think that the operator today has the chance of a lifetime to sell his community on charter flying. With all forms of transportation loaded to the gills the charter operators can lay a solid foundation of customers who have had the advantage of charter flying proven to them. Especially if he will use some of his light airplanes for the job so that he can get his prices down to a moderate figure. ★ ★ ★

FLIGHT SAFETY FOR WOUNDED

Highly-trained crews care for hospital-plane patients.

THE main job of the Ferrying Division of the Air Transport Command is the delivery of airplanes to the fighting fronts; but the Division is called upon to do many things, one of which is to see that the wounded are safely flown to hospitals. Ingenuity is often demanded to meet special conditions of the wounded or injured. This was the case recently at the Fifth Ferrying Command at Dallas, Texas.

Maj. Gen. U. G. Ent, back in the States after many missions over Germany, was taking off from a Texas field. His co-pilot, through a misunderstanding of signals, pulled up the landing gear too soon. Not yet airborne, the craft crashed to the runway; one of the propellers broke, hurling part through the side of the ship, striking the general.

Medical officers found that the propeller part had cut through the muscles of the general's back, had torn his ribs from the spine and had knocked the lower vertabrae to one side. There was severe pressure on the spinal cord; the least jar would have killed him instantly. A medical specialist was flown in, and instructions were given to fly the general to a hospital in San Antonio, guarding against the slightest bump or jolt. For the trip, he was rigidly lashed to a specially built stretcher.

Major Clarence S. Chiles, a veteran of about 4,000 hours, was selected to be the pilot, with Major Harold L. Carter as co-pilot. Major Chiles checked the weather and saw that the air was rough at lower altitudes but comparatively smooth at 5,000 feet. He then checked the taxi strips and the smoothest was selected for the take-off. A Douglas C-49 was chosen for the trip. The plane taxied slowly to the ramp then power was applied very slowly so there would be no jerk on take-off, and the plane left the ground at reduced throttle to lessen vibration. On reaching 5,000 feet, the only realm of comparatively smooth air, full cruising power was applied to get the officer to the hospital quickly.

The field at San Antonio had been cleared for them, and Major Chiles decided on a long approach and a power-on landing. On the downwind leg, he ordered the landing gear to be put down as easily as possible. Then, when the plane was about 1,000 yards from the boundary of the field, Major Chiles ordered the flaps to be "milked down" as slowly as possible. He landed without a bump and the injured general was no worse for the trip. A rough landing would have been fatal. ★ ★ ★

Information please . . .

at the

NATA

Convention . . .

Frankly, we expect to learn a lot at the N A T A Convention . . . and are looking forward with interest to hearing your ideas and plans for the future of our industry. Also, we hope to make a worthwhile contribution.

For 11 years we have been a source of supply for Aircraft Dealers. That's given us a lot of information which we'll be pleased to pass on. We're anxious to share our experience with you—to add what we have learned to your fund of knowledge—to consult with you on your own specific problems, and to submit workable, profit-making suggestions.

While at the Convention you are invited to visit the main office and warehouse of Supply Division, Inc., and see the complete stocks of aircraft hardware, parts and accessories that enable us to maintain our reputation for "same-day-service."

SUPPLY Division Inc.

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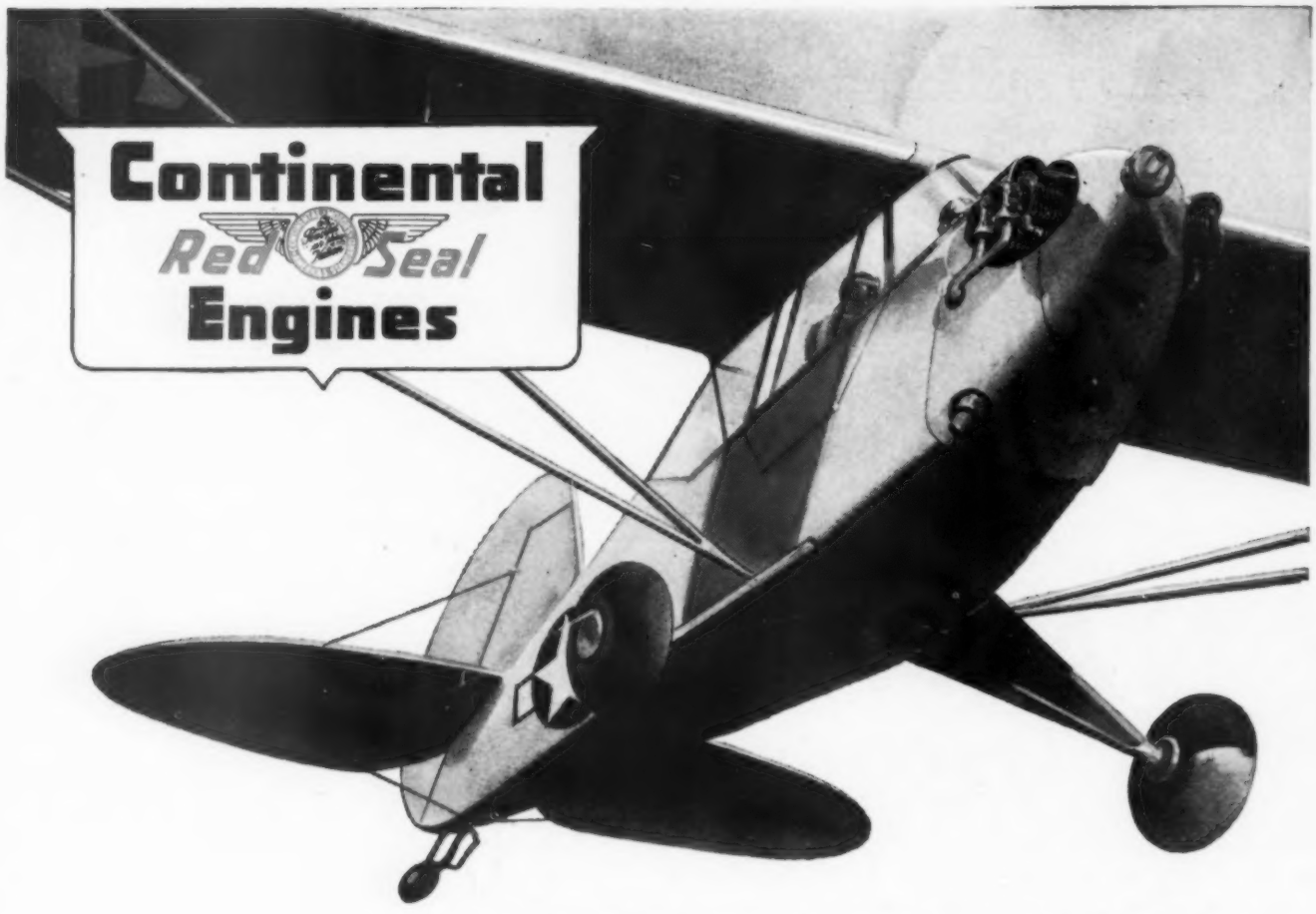
YOUR *"Warehouse Annex"* FOR AERONAUTICAL SUPPLIES



POWER TO WIN

The newest plane carrier, an LST converted into a flat-top by the use of a portable landing strip, can carry eight Continental powered "Grasshopper" planes. These speedy observation planes with their dependable Red Seal Power are fast on the take-off, highly maneuverable, and are effectively used to spot enemy positions.

However, this is only one of the many applications of Continental Red Seal Power — the Power to Win — which has contributed so much on all fighting fronts.

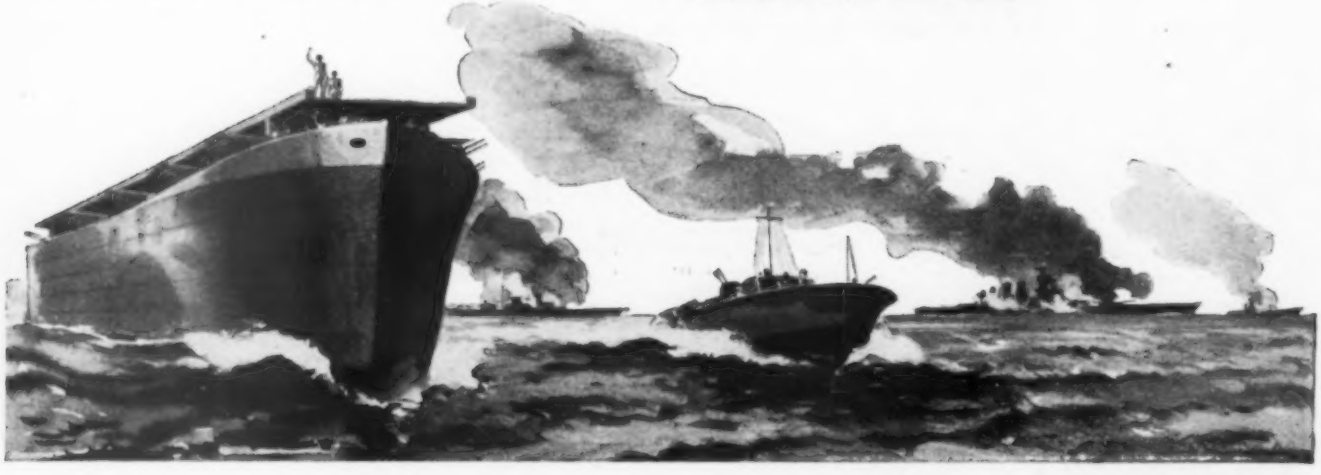
ARMY E NAVY

Awarded to the
Detroit and Muskegon Plants
of Continental Motors
Corporation
for High Achievement

Your Dollars are Power, too!

Buy War Bonds and Keep Them!

Continental Motors Corporation
Aircraft Engine Division
MUSKEGON, MICHIGAN



WELSCH TO DIRECT STINSON SALES

APPOINTMENT of James C. Welsch as private sales director for the Stinson division of Consolidated Vultee Aircraft Corporation, was announced late in November by F. A. Learman, general sales manager.

Welsch, a veteran of twenty years in aviation, joined Stinson in 1938 as eastern sales manager and remained in that capacity until the United States' entry into the war, whereupon he went to England for two years as a pilot-engineer with the Eighth AAF and the Royal Air Force.

The former test pilot, one of the nation's best known barnstormers, returned to the United States in June, 1943. Since then he has been assigned to the economic research department at Convair's San Diego offices. Welsch was sales manager for the first company to manufacture light aircraft in the United States. He entered aviation in 1924 and toured the nation with a "flying circus." After organizing the first combination flying and ground school in Cincinnati, Welsch became business and sales manager for the Dixie Davis Flying Field Corporation at Cincinnati's Lunken airport.

James C. Welsch

He became associated with the Aeronautical Corporation when it was organized in 1929, and was a director and sales manager for the corporation when he joined Stinson in 1938. Welsch will make his headquarters at the Stinson division in Wayne, Mich.

POSTWAR OUTLOOK

(Continued from page 32)

will sell hangars. In any case, he must be prepared to either provide hangar service for his customers, or tell the customer where he can buy one. Personally, I favor the individual hangar. It affords privacy for the owner. It reduces the costly manpower problem, and the delay involved when twenty planes must be moved in a large hangar in order to get out the one plane wanted at the moment. Again importantly, hangars have a very definite bearing on fire insurance rates.

The sales manager must also have an adequate finance plan. Selling in America has been geared to the time payment. Many companies are being attracted to this field and here too, every effort must be made to get rates down.

Before the war, a large proportion of the smaller planes were sold on time. Insurance charges were responsible for part of the high financing cost. But the insurance people should not be blamed for all of the costs. Hidden finance charges also crept in, and the customer buying on time sometimes paid the full price of an insurance policy but only received an "Insurance Certificate" which costs less and furnishes less protection. It should be the duty of the sales manager to sponsor only such finance plans as offer the best value and the greatest insurance protection. It is just as important to remove $100 worth of hidden finance or insurance charges for his customers as it is to take $100 out of the manufacturing cost of the plane. Finance plans will also play their part in connection with demonstrator plans as well as for those which are floor-planned.

Market Data Needed

The sales manager will also have up his sleeve plans for rent-a-plane service in which his dealers or others may wish to engage. With thousands of military pilots available who will wish to maintain their licenses and fly when they can afford it, this market should prove profitable — provided it can be made economically sound.

There is one question which must be answered to the satisfaction of dealers who are making their first entry into the field. This is the question of how much investment is required in order to start the business. Certainly, stocks of airplanes and parts must be carried.

In many cases, particularly in the higher price field, dealers could not afford to stock planes before the war. Planes were costly but more importantly, they were "custom built" with wide choices in colors, upholsteries, instruments, and radio equipment. The factories must solve this problem if they are to secure a production flow and hold costs down. Models must become more standardized, with provisions whereby the dealer can easily add additional equipment which may be desired.

In this connection, I can tell you that the Bendix Aviation Corporation, which builds a tremendous number of the components which go into our present military and airline planes, is also greatly interested in the future of the personal plane. Separate engineering research has been established to take advantage of production and engineering lessons learned through the war and to apply these to the personal plane. Our goal is to develop special "packaged instruments," starters, generators, radios, brakes, shock absorbers, and other necessary units for the personal plane at the lower prices for better products which the personal plane requires.

The trade-in will also play a prominent part in the picture just as it did before the war. My belief is that the industry should join through the Aeronautical Chamber of Commerce in the compilation of a "Blue Book" similar to that used in the automobile industry so that fair prices can be established for used planes. Such a book will be invaluable to the dealer, the finance company or the bank, because used planes too must be financed.

The vital matter of territories calls for most careful study. This time instead of arriving at territorial boundaries by drawing random lines on a map, the sales manager will probably have given diligent study to trading areas. He will have detailed information on each trade area. He will have figures on the incomes of the various area groups and will see that prospect lists are available. He will know the number of airports, pilots, students and other pertinent area facts. He must set a fair and mutually profitable quota for each area.

He must guard the interests of both the dealer and the factory against territorial assignments that are too large to be worked frequently and economically, or too small to give the dealer a proper volume of business. The size and shape of the territory is one of the most difficult questions he must face. The experienced sales manager knows that the dealer will ordinarily ask for more territory than he thinks he can get. To satisfy him the sales manager will require far more accurate information than he was ordinarily equipped with before the war.

Now let's move over to the dealer's

side of the problem. He can be sure that every well-known airplane company has hundreds of dealer applications in its files today and just because he was an airplane dealer before the war doesn't mean that a man will automatically have a desirable franchise in the postwar era.

Aviation's appeal is very strong and many capable and financially able merchandisers of other lines are willing and anxious to get into the industry on the ground floor.

Dealer's Outlook

The airplane dealer of other days who tied up the exclusive selling and operational rights on an airport and then sat and waited for business will have plenty of competition. The interested automobile, refrigerator, or new type of merchandiser will have the capital and the willingness to build an air park for his own use and make it so attractive that he will induce trade.

Likewise, this man need not depend entirely on revenues from airplane sales for his livelihood. He has vision and is prepared to invest for the long pull. And he doesn't have to have the gift of second sight to know that aviation is a business which is definitely on the up grade.

So my friends among the "Old Timers," you are facing serious competition. That shouldn't alarm you. Rather, it should encourage you. Competition only exists where business exists.

But you should know how very real this competition is. Here are some figures. *Collier's* recently made a very careful survey of the aviation field. Inquiries were mailed to automobile dealers in cities of 100,000 or less and eight out of ten automobile dealers stated *they might be interested* in taking on a light plane dealership after the war. One-third of all dealers reporting said they are making plans now for such a business. Nearly all of those planning for such a business (93 per cent) regard an airplane dealership as an addition to their present automobile business.

The *Automotive News*, spokesman for the motor car industry, has also conducted a poll. They asked: "Have you given any thought to selling private airplanes after the war?" Out of 708 answers, 55.6 per cent said "Yes."

They asked: "Would you still sell planes if prices were in the range of early automobiles?" Five hundred eighty-seven answered and 66.3 per cent said "Yes."

They asked: "Have you a son, relative or former associate who is now in the air service?" Seven hundred twenty-five answered and 38.3 per cent said "Yes."

WALT BOHRER

"This is Mr. Squinch, who is in charge of our wind tunnel."

The latter question seems particularly significant. Here is a large group of dealers with a special reason for wanting to enter the airplane business. And I think it fair to assume that the relatives of those dealers will probably be strong advocates in wanting the dealer to sell airplanes.

Therefore, the dealer applicant who can come to the factory with the best analysis of his territory, the best and most attractive airport and housekeeping set-up, the greatest amount of merchandising experience, and adequate financing is the one who will probably walk out with the franchise.

Bright Prospects for Business Men

In my opinion, the personal plane holds the key to aviation's growth in America. The development of military aircraft must naturally continue so that we will never again be placed at a disadvantage. Airline service, strengthened by a national network of feeder lines, will provide a greater market for aircraft and better service to the public. Both these markets have limits so far as quantity production is concerned. They might be compared to the present bus and truck markets which are sizeable but do not begin to approach the volume of passenger car production.

The market for the personal plane is limited only by our ability to produce safe, easy-to-fly airplanes of greater utility at prices within the public's means; by the development of thousands of conveniently located landing facilities; by the development of millions of pilots and through the creation of a genuine desire on the part of the public to own a personal plane. The use of the privately owned airplane for business purposes must also receive greater attention.

"On the surface," says *Collier's* survey, "it might appear that the importance of the pleasure factor in owning a personal plane indicates that the public does not take flying seriously. It will be recalled, however, that during the first years of the automobile few people recognized the business utility of the auto. Pleasure was important in introducing the auto to the mass market. First came the sportsman tourist with goggles and special garb. Then there developed a more serious automobile owner, who found a use for it in his business. Today, according to a survey reported by the Automobile Manufacturers' Association, 56 per cent of all cars are used on business trips, nine out of ten of these at least once a week."

From every standpoint, the personal plane has a bright future in which the capable dealer will share and prosper. As a keen observer has said, "We are not going to return to anything." Certainly we are not going to return to the lackadaisical selling methods of 1941. ★ ★ ★

Private Pilots: FLY SOUTHEASTERN

Our ASSOCIATE BASES are opening ALL OVER DIXIE

- Our job today is to look toward new horizons... and to knit together a great pattern of small business in the service of aviation. In so doing we render a greatly needed service to private flyers, to counties and municipalities, to aircraft manufacturers and, in fact, to all who are a part of the aviation industry.
- The organization of Southeastern's Associate Bases is the dominant factor in the execution of our plan, which is simple. Each Associate Base operates as an individual proprietorship or company and provides a local management and local community cooperation. We assist by supplying airplanes, sales financing, insurance and mass purchasing contact. We also supply our maintenance and service facilities at special rates.
- Individuals who are interested in these franchises throughout Dixie should write to us immediately. We also invite inquiry from manufacturers and others interested in sales or service.
- Because we have spent many months in the preparation of this plan of Associate Bases, because we are experienced in flight operations and because our Associates are controlled by a strict policy of competence in their operations, we believe that we can say with confidence to the private pilot: "FLY SOUTHEASTERN!"

Instruction *Overhaul and Repair* *Instrument Ratings*
Charter Flights *Sales and Service*

SOUTHEASTERN AIR SERVICE, INC.

Executive Offices and Operating Base
ATLANTA, GEORGIA

ASSOCIATE BASES ALL OVER DIXIE

OVERHAUL & REPAIR BASE ATHENS, GA.

OPERATING BASE MACON, GA.

CONFESSIONS OF A FLIGHT INSTRUCTOR

(Continued from page 34)

along better with one instructor than with another.

My partnership with Bob Swift in Athens, Ohio, was ideal for that reason. Bob puts plenty of thought into his flying, but his natural method of teaching is to let the student fly the airplane and tell him how to correct mistakes after they have become obvious. It is a good method, but some students have to know the "reason why" before they can stop doing something that seems logical to them and learn to feel natural doing what is correct.

I believe in letting the students do the flying and discovering their own mistakes, but I like to explain the theory behind the manipulation of the controls. So when Bob got stuck—as the best of instructors will—he turned the student over to me, and we usually ironed out the trouble. Of course, talking can be overdone. I have to be careful not to talk too much, and to say what I must in words that fit the student's experience. Too much talk will muddle some students. When I ran into one of these, I turned him over to Bob.

In the September issue of SOUTHERN FLIGHT, Glenn Miller wrote, "Unfortunately I was told what to do but not enough of why." Obviously, Mr. Miller is a mental type who got tangled up with a mechanical type instructor. Probably he had the interest and energy to dig out the "why" on his own and came out all right in the end. However, to some students, too much "why" might be just as confusing as too little.

Although my mental processes seem to be like Miller's, I am opposed to preflight ground instruction—but I had better not get started on that now.

The question is, how can an instructor tell whether a man who wants to learn to fly is mechanical or mental before he takes a lesson? Often his occupation will furnish the tip-off. His work, his hobbies, or his studies may tell something about his potential flying ability, too.

Musicians are likely to be physical types. It may sound funny to put musicians in the same class as football players, but it is true that both depend on muscular co-ordination. Good ones must have brains, too, but their minds are trained principally to receive outside stimuli and direct their muscles accordingly without concerning themselves much about reasons. A musician does not have to know that a chord is harmonious because of a mathematical relationship between the vibrations of its component notes. It sounds right and that's that.

While there may be no direct relation between the muscles used in playing the violin or piano and those used in flying an airplane, the fact that a man has been capable of developing such muscular co-ordination indicates that he will also be able to develop the co-ordination required to fly an airplane. In general, musicians seem to make good fliers.

Athletes may give their instructors some thrilling moments before they learn to use their skill rather than their strength, but a good athlete can obviously learn to control his power. Bobby Watts only weighed 145 pounds, but nobody ever got through him when he played center for Ohio State. He exercised quick-thinking and co-ordination. Bobby should have made a great pilot.

You might expect an engineering student to be a mental type—and you would be right. To do a good job of teaching him, an instructor will have to brush up on his aerodynamics. I had one honor student of electrical engineering who was very awkward at the start, but once he thoroughly understood the forces involved he did as nearly perfect a job of flying as I have ever seen. Unfortunately he had bad judgment, which can't be cured by teaching. (If you find a way to do it you will inscribe your name indelibly in the annals of mankind.)

The best flying students I have ever known were "A" students in engineering who also were or had been good athletes.

If you think there is no relation between "intelligence tests," academic grades, and flying, you had better take a second guess. I took the trouble to look up the IQ's and scholastic records of forty CPT students in one college, and compare them with their instructors' ratings of their ability as pilots. The results indicated conclusively that those who stood at the top in *both* psychological and scholastic grades were also in the upper brackets of flying ability, while the boy who was at the bottom of *both* lists was also at the bottom of the pilot ratings. In fact, he was the only washout in the group.

But here is something for the college professors as well as the flight instructors to ponder over. In more than three cases out of four, *the boys' college grades were better when they were taking the flying courses than they were before.*

Like many older pilots, Lt. Francis A. Dolan, Naval aviator, did not believe that there was any relation between a student's ability in ground school and in his progress in flight. When he was ground school instructor in a flying school where I taught a cross-country course, he changed his mind because every time I discussed an especially slow student with him, it invariably was the one who was having the most difficulty in ground school.

Instinct Counts, Too

Books could be written on details of analyzing students, but most flight instructors would not read them. All I have tried to do here is suggest an approach. Maybe we can take up some specific cases if you keep reading me long enough.

Before leaving the discussion of mental and physical type students, however, let's ask whether a mental type can ever learn to fly instinctively. I did not think so. Psychologists say that instincts cannot be acquired. I don't pretend to know the answer, but look what happened to me:

I was a mental type. I had to think about my flying. Eventually I thought and acted faster, but still I had to think about it. One day I was giving a student takeoffs in a stiff 45-degree cross-wind from our right. It seemed that he just would not give enough left rudder, and I was verbally hammering the idea into his head. Finally he started a beautiful take-off run, with plenty of left rudder, going down the runway like an arrow. I put my feet flat on the floor. In the wink of an eye, the tail was heading for the place the nose should be. I thought the student must have both feet on that left rudder. By the time I got my feet back on the pedals and pushed him off, we were off the runway at a 90-degree angle, threading our way among stakes, graders, workmen and piles of dirt in a part of the field under construction.

I got the nose back toward the wind, and began to think: "I am doing the wrong thing. The wind is from my right; so I should be using left rudder and right stick; but I am using right rudder and left stick . . . I am doing just the opposite of what I should!" But I just did not have enough will-power to make my muscles do what my mind said was right.

At last we were in the air and I began to relax, and wonder how we got there in one piece—with me doing everything wrong. A light began to dawn! As I missed the administration building by a few feet, I looked at the wind-T. Sure enough, it pointed exactly opposite direction it had when we started our take-off.

Not only without thinking, but in direct opposition to my thinking and conscious effort, I had done the right things.

Is that instinct? ★ ★ ★

NOTICE

A DISTINGUISHED NEW NAME for A DISTINGUISHED OLD SCHOOL, A NAME THAT, IN THE SUPREME TEST OF WAR HAS COME TO SIGNIFY A NEW HIGH STANDARD IN AVIATION TRAINING . . . .

CAL-AERO TECHNICAL INSTITUTE

MAJOR C. C. MOSELEY — PRES. SINCE 1929

FORMERLY CURTISS-WRIGHT TECHNICAL INSTITUTE

When Major C. C. Moseley, president of Cal-Aero Technical Institute, was selected by the Army Air Forces as one of nine civilian school operators to conduct the radical experiment of training Army Air Force pilots in civil schools, the name "CAL-AERO" came into existence. So successful did the plan prove that the Army went entirely out of the business of giving primary training, and ultimately 64 such schools, the majority of them patterned after "CAL-AERO," sprang up throughout the nation. At the same time and under the same personal supervision of Major C. C. Moseley, the great school which had trained thousands of civilians as mechanics and engineers since 1929, and that hereafter will be known as CAL-AERO TECHNICAL INSTITUTE was training 7,500 Army Air Force ground crew members. It was the first school—and for a long time the only school—in the west, to be selected by the Army to do this training.

With an unmatched and unparalleled record of efficiency and safety in training more than 20,000 Army Air Force pilots; more than 1200 having been decorated for valor; together with this school's record of training Army Air Force technicians, all under the personal supervision of Major C. C. Moseley since 1929; it was but natural in planning for the post-war period that these schools come under the distinguished name of "CAL-AERO."

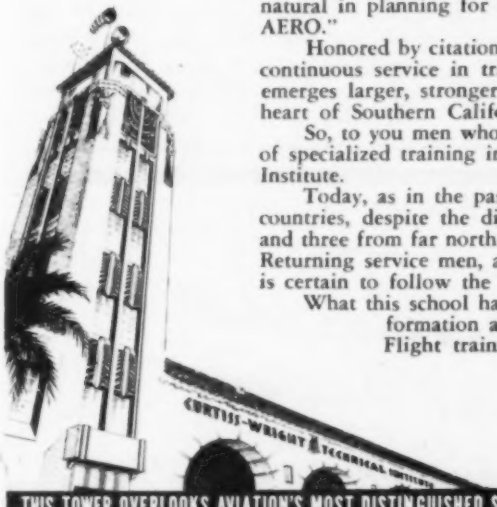
Honored by citations for distinguished service in training these men for the Army Air Forces, together with continuous service in training civilians for the production front, CAL-AERO TECHNICAL INSTITUTE emerges larger, stronger and finer than ever before, on its own airport, Grand Central Air Terminal, in the heart of Southern California's giant aircraft industry.

So, to you men who look forward to a career in AVIATION, you will find the best to be had in the way of specialized training in Aeronautical Engineering and Master Aviation Mechanics, at "CAL-AERO" Technical Institute.

Today, as in the past, civilian students continue to pour into this school from many states and foreign countries, despite the difficulties of war time travel. In one recent week, two students from far south India and three from far north Iceland arrived simultaneously. Latin America and China both are heavily represented. Returning service men, anxious to fit themselves for an outstanding place in the golden age of Aviation, which is certain to follow the war, likewise are enrolling upon discharge.

What this school has done for its graduates, it can do for you. Write or mail coupon today for full information about the possibilities of a post-war aviation career.

Flight training is restricted to Army Air Force Cadets for the duration.



THIS TOWER OVERLOOKS AVIATION'S MOST DISTINGUISHED SCHOOL OF AERONAUTICS

CAL-AERO TECHNICAL INSTITUTE

FORMERLY CURTISS-WRIGHT TECHNICAL INSTITUTE

GRAND CENTRAL AIR TERMINAL
1220 AIRWAY, GLENDALE 1, CALIFORNIA
(LOS ANGELES COUNTY)

UNDER PERSONAL SUPERVISION OF MAJOR C. C. MOSELEY, PRESIDENT AND FOUNDER, SINCE 1929

ON OUR OWN AIRPORT - IN THE HEART OF THE AIRCRAFT INDUSTRY

BE WISE—PROTECT YOUR FUTURE

MAIL TODAY • DON'T DELAY

WITHOUT COST OR OBLIGATION SEND ME FULL INFORMATION AND CATALOG ON THE COURSE CHECKED BELOW

- ☐ AERONAUTICAL ENGINEERING COURSE
- ☐ MASTER AVIATION MECHANIC COURSE
- ☐ SPECIALIZED ENGINE COURSE
- ☐ SPECIALIZED AIRPLANE COURSE
- ☐ POST GRADUATE AERONAUTICAL ENGINEERING COURSE
- ☐ SPECIALIZED AIRCRAFT SHEET METAL COURSE
- ☐ AERONAUTICAL DRAFTING COURSE, HOME STUDY
- ☐ AIRCRAFT BLUE PRINT READING COURSE, HOME STUDY

NAME _____

ADDRESS _____

CITY _____ STATE _____

DATE OF BIRTH _____

TOOLING DOCK

(Continued from page 42)

to contour blocks or by assembling on tool holes; and, either way, the tool hole is used to position the locator. In the former case, the tool hole acts simply as a construction hole during dock set-up operations.

The master tooling dock makes it possible to apply line production technique to the job of constructing assembly tools, because the flow of fixtures through the dock is akin to the flow of parts on an assembly line. The old practice of assigning leadmen to the responsibility of building specific fixtures from start to finish has given way to reorganization into groups of specialists. For example:

(a) A group that specializes in the cutting and making of rough structures.

(b) A group that specializes in the finishing operations on locators from templates.

(c) A group that specializes in drilling and machining operations on fittings.

(d) A group that specializes in assembling fixtures in the master tooling dock.

(e) A group that does "pick-up" work such as installing clamps, applying stencils, painting and positioning fixtures in the desired locations on the assembly line.

The co-ordination of these activities can be effectively administered through the production control group that takes care of the ordering of material, the procurement of essential drawings, template and tool orders. It has been found that such reorganization, in itself, can effect a reduction in cost and time of approximately 50 per cent; simultaneously, it facilitates the co-ordination of the tooling program in accordance with preplanning schedules.

Latest development in the use of the master tooling dock has been, as previously suggested, in scribing the grid lines which locate the reference points used in lofting an airplane. This is accomplished simply by setting the straightedges on the 10.000-inch grid holes over the board or sheet to be scribed, and then using the straightedges to guide the movements of the scriber. Thus all possibility of deviations in the dimensions used in the master loft and in the master tooling dock may be eliminated.

Up to the present time, the principles and methods of the master tooling dock have been applied only in the aircraft industry. However, they could be advantageously utilized in any industry where precise and co-ordinate assembly tools and gages are required. ★ ★ ★

Airmen's Calendar

December 17—Presentation of Collier Trophy and Eighth Annual Wright Brothers Lecture, Institute of Aeronautical Sciences, U. S. Chamber of Commerce Auditorium, Washington, D. C.

December 20—Meetings of East Coast Aircraft War Production Council, New York, and West Coast Aircraft War Production Council, Los Angeles.

January 5-6—Florida Aviation Conference, State NAA Council, Orlando.

January 8-12—Society of Automotive Engineers Annual War Engineering Meeting, Book-Cadillac, Detroit.

January 30-31—National Aeronautic Association Annual Business Meeting, Denver.

May 20-27—Pan-American Aircraft Exposition, Dallas.

LOCKHEED'S FEEDER DESIGN

(Continued from page 35)

This is expected to reduce maintenance costs and time.

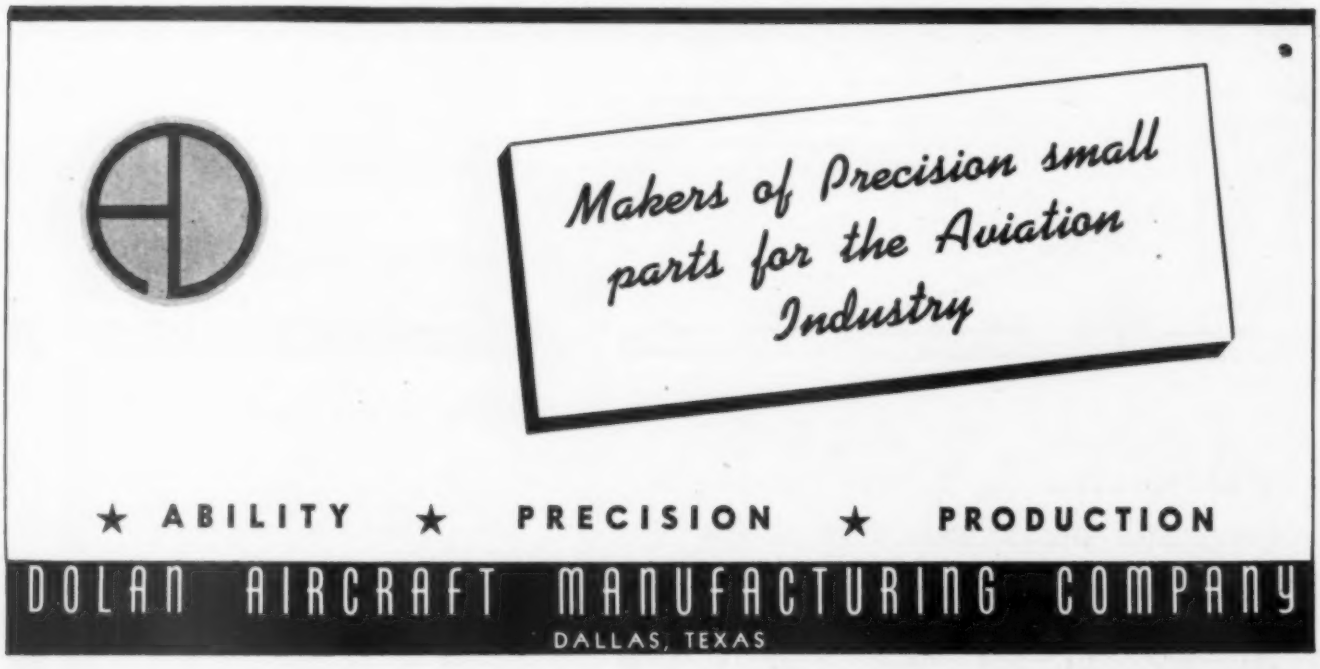
Two feeder line applicants are reported to have already signed contracts for purchase of Lockheed Saturns.

In commenting on the new model, Robert E. Gross, president of Lockheed, stated, "The requirements of the short-haul, high-frequency airline are extremely difficult. They call for a staunch, swift airplane that will give high performance at low cost. The interurban airplane must be efficient and economical. The Saturn is that airplane."

Small enough for the short-haul operation, the Saturn will operate with sufficient economy to be self-supporting on a relatively light payload, Gross pointed out. These characteristics make the new craft ideal for trunk-line operations through light traffic areas, and the plane is expected to find a ready market in European and other areas where high frequency of flights combines with short distances, or in other parts of the world where sparsely populated areas must be served.

The Saturn is described by Lockheed as being the first commercial aircraft of its type to utilize for peacetime flying the improvements in aerodynamic, structural and mechanical design which have been made during the war.

Top speed of the airplane is 240 mph. and maximum range with eight passengers is 1,600 miles. No dimensions, costs or additional specifications were released. ★ ★ ★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DALLAS, TEXAS

Flying Bazooka

MYITKYINA, BURMA...a Jap garrison is almost surrounded by Chinese and American forces, but Jap supplies are still coming through. A P-51 Mustang squadron is out to break the supply line. Bazooka tubes are mounted on the Mustangs' wings and the Yanks are out shooting sky rockets at the Nips. Water-borne supplies get holes punched in them. Trucks and trains are blasted out of this world. A new incurable headache for the Japs is born...flying bazookas.

BONDS bought these planes.
WASTE FATS helped arm them.
WASTE PAPER helped ship them.
GASOLINE flies them.
WILL YOU help deliver the next squadron?

Buy Christmas Seals

North American P-51 Mustang Fighter

Six Bazooka Tubes, three on each wing · Six 50 cal. machine guns, three in each wing · Two 1,000 lb. bombs, one under each wing

WORLD'S FASTEST FIGHTER PLANE... SPEED OVER 425 M. P. H.... CEILING OVER 40,000 FEET

North American Aviation *Sets the Pace*

PLANES THAT MAKE HEADLINES... *the P-51 Mustang fighter (A-36 fighter-bomber), B-25 and PBJ Mitchell bomber, AT-6 and SNJ Texan combat trainer. North American Aviation, Inc. Member, Aircraft War Production Council, Inc.*

FIRST COMPLETE ASSEMBLAGE OF CAA REGIONAL MANAGERS with the Administrator was held in Washington recently to co-ordinate postwar operations. In this unusual photo also is the head of the recently-established Ninth or Pacific Islands region. Left to right, standing, are Howard A. Hook, Sixth; John E. Sommers, assistant administrator; Marshall C. Hoppin, Eighth; William E. Kline, Fifth; John E. Beardslee, Ninth; William M. Robertson, Second, and Deputy Administrator Charles I. Stanton, who is in direct charge of regional offices. Seated, left to right, are Oren D. Harwood, First; Al S. Koch, assistant administrator for foreign operations; H. R. Neely, Third; L. C. Elliott, Fourth; Paul R. Morris, Seventh; William A. M. Burden, assistant Secretary of Commerce, and Administrator T. P. Wright. —(CAA Photo.)

YOU ASKED FOR IT

(Continued from page 30)

be limited to the operation of a particular aircraft and to the type of operation.

Any of the above required maneuvers may be modified or eliminated if such action is appropriate to the characteristics of the aircraft used in the test and appropriate operation limitations are entered on the rating record.

(b) Applicant for a glider rating must demonstrate his ability to competently perform the following maneuvers:

(1) one flight with a 180-degree turn and a down-wind landing;

(2) two flights with a 360-degree turn to right and left, respectively, landing each time at a point not more than 100 feet either side of a designated mark;

(3) two flights with right and left turns in each flight.

20.3 COMMERCIAL PILOT RATING

20.30 *Age.* 18 years.

20.31 *Citizenship.* Applicant for a powered aircraft or glider rating must be:

(a) a citizen of and of unquestionable loyalty to the United States, or

(b) a person who is in sympathy with the objectives of the United States and who is a trustworthy citizen of a friendly foreign government not under the domination of or associated with any government with which the United States is at war and which government grants reciprocal commercial pilot privileges to citizens of the United States upon equal terms and conditions with citizens of such foreign government. A certificate may be issued to an applicant who is a citizen of a friendly foreign government which does not grant reciprocal privileges. The effectiveness of such certificate shall in any event terminate six months after the war and may be terminated by the Administrator at any time without notice. Upon application to the Administrator the war limitation clause may be removed whenever the government of the country of which he is a citizen grants the reciprocity required in this section.

20.32 *Education.* Applicant must be able to read, write, speak, and understand the English language.

20.33 *Physical standards.*

(a) Applicant for a powered aircraft rating must meet the physical standards of the second class prescribed in Part 29.

(b) Applicant for a glider rating must certify that he has no physical defect which renders him incompetent to pilot a glider.

20.34 *Aeronautical knowledge.*

(a) Applicant for a powered aircraft rating must pass a written examination covering such of the provisions of Parts 01, 20, 43, and 60 as are pertinent; meteorology as applied to the recognition of weather conditions while flying, the analyzing of weather maps and sequence reports furnished by the United States Weather Bureau; practical air navigation problems including the use of maps, navigation by terrain, by dead reckoning, and the use of navigational instruments and aids; the theory and practice of flights; the maintenance of aircraft and the maintenance and use of aircraft powerplants in common use.

(b) Applicant for a glider rating must pass a written examination on such of the provisions of Parts 01, 20, 43, and 60 as are pertinent or hold a powered aircraft rating.

20.35 *Aeronautical experience.*

(a) Applicant for a powered aircraft rating must have logged at least 200 hours of solo flight time of which at least five hours must have been logged within sixty days immediately preceding the date of application. As part of the foregoing requirements the applicant must have logged at least ten hours of solo cross-country flying, including at least one flight to a point not less than 100 miles distant from the point of departure with three full-stop landings at different points on the course.

(b) A graduate of the commercial pilot course of a certificated flying school will be deemed to have met the requirements of this section if he presents his certificate of graduation and makes application within thirty days after graduation date.

(c) Applicant for a glider rating must have logged at least 250 gliding flights or 200 gliding flights and five hours of gliding or soaring. At least five of such flights must have been made within sixty days preceding the date of application. Applicant must also have had at least one hour of instruction in recovery from stalls and spins in a conventional airplane of not more than 1,500 pounds maximum authorized weight. An applicant who is the holder of a rating for powered aircraft who has logged not less than 100 gliding flights or five hours of gliding or soaring solo flying time will be deemed to have met the requirements of this section.

20.36 *Aeronautical skill.*

(a) Applicant for a powered aircraft rating must demonstrate his ability to perform competently the following maneuvers:

(1) a series of three landings from an altitude not to exceed 1,000 feet with engine throttled and a 180-degree change in direction, the aircraft touching the ground in normal landing attitude within 100 feet either side of a designated mark. At least one landing must be accomplished from a forward slip;

(2) a spiral in each direction of not less than three full turns in a banked attitude of not less than 60 degrees, with engine throttled;

(3) three shallow figure eights either "on pylon" or "around pylon", three steep figure eights either "on pylon" or "around pylon" and one 720-degree power turn in each direction in a banked attitude of at least 60 degrees. During each of these maneuvers the total variation in altitude shall not exceed 100 feet;

(4) a two-turn spin in each direction with a recovery error of not more than plus or minus 10 degrees;

(5) co-ordination exercises, straight climbs, climbing turns, slips, and emergency maneuvers such as simulated forced landings and recovery from stalls entered from both level and steeply banked attitudes.

Any maneuver provided for in this section may be modified or eliminated by the examining inspector if such action is appropriate to the characteristics of the aircraft used in the test and appropriate operation limitations are entered on the rating record.

(b) Applicant for a glider rating must demonstrate satisfactorily his ability to perform competently the following maneuvers:

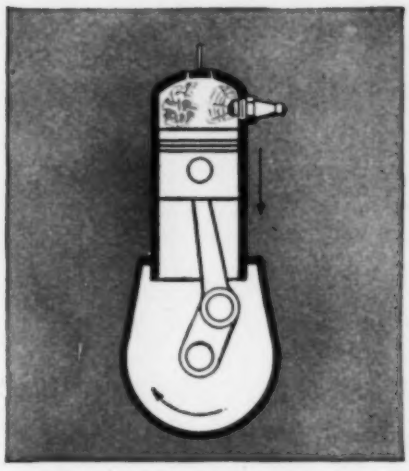
(1) one flight wtih a 180-degree turn and down-wind landings;

(2) two flights with a 360-degree turn to right and left, respectively, landing each

New Flight Instrument guards against fuel waste!

M.I.T.-SPERRY DETONATION INDICATOR INSURES FUEL ECONOMY . . . LONGER ENGINE LIFE . . . GREATER SAFETY

1. THE ENGINES on this airplane may be detonating, but the pilot has no way of knowing. Detonation means *destructive combustion*. In your car, you can *hear* detonation. In aircraft, the noise level is too high.



2. DETONATION increases internal temperature and pressure tremendously. If continued, it damages engines, may cause failure. How is it possible to tell when detonation occurs in flight?

3. THE M.I.T.-SPERRY Detonation Indicator detects detonation *instantly*. A flashing light on the instrument panel warns pilot to change fuel mixture. Result? Greatest operating efficiency *without damage to engines*.

4. *REMARKABLE savings in fuel!* Preliminary tests show savings of 10% or more over typical airline practice. Payload can be added. Safety is increased . . . engine life prolonged . . . periods between overhaul lengthened.

Courtesy Wright Aeronautical Corp.

5. THE M.I.T.-SPERRY Detonation Indicator is installed externally—requires no piercing of cylinders. Visual signal gives instant warning of detonation. A selector switch then determines in which cylinder combustion is faulty.

6. A SPERRY *Automatic Mixture Control* may be used in conjunction with the Detonation Indicator. When detonation occurs, this device *automatically and instantly* eliminates this condition and hunts as lean a mixture as possible without sacrifice of power.

The *Detonation Indicator* is designed for use on all types of engines and aircraft. Where economy of operation is important . . . as it will be in postwar commercial aviation . . . this new flight instrument will stand continuous guard against wasteful conditions.

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time at a point within fifty feet either side of a designated mark;

(3) two flights with right and left turns in each flight.

20.4 AIRCRAFT, FLIGHT INSTRUCTOR, AND INSTRUMENT RATINGS

20.40 *Aircraft rating competence.* Applicant for additional aircraft ratings, subsequent to the original issuance of a pilot certificate and rating record, must demonstrate competence in the type of aircraft and, in the case of an airplane, the class and horsepower range for which the rating is sought. A pilot limited by his rating record to two-control nonspinnable airplanes applying for a rating for three-control spinnable airplanes must have logged at least thirty solo hours and must demonstrate his ability to enter and recover from spins.

20.400 *Aircraft type rating.* The types of aircraft for which ratings may be issued are as follows:

(a) airplane,
(b) autogiro,
(c) helicopter,
(d) glider.

20.401 *Airplane class rating.* The classes of airplanes for which ratings may be issued are as follows:

(a) single engine land,
(b) single engine sea,
(c) multiengine land,
(d) multiengine sea,
(e) unconventional.

20.402 *Airplane horsepower rating.* The range of horsepower of airplanes which will be included in the rating issued is a follows:

(a) 130 or less horsepower, if competentce has been demonstrated in airplanes certificated for a mixmum-except-take-off of 130 or less horsepower;

(b) except where paragraph (a) is applicable, a range of horsepower extending from 50 per cent less than to 50 per cent greater than the total certificated maximum-except-take-off horsepower of the airplane in which competency was demonstrated;

(c) a continuous range extending from the lowest to the highest horsepower for which applicant has qualified.

20.403 *Application of multiple class and horsepower ratings.* The horsepower rating applies to all airplane class ratings. An applicant who has demonstrated competence in both single and multiengine landplanes and seaplanes may be rated for all airplane classes except unconventional.

20.41 *Flight instructor rating.*

20.410 *Age.* Eighteen years.

20.411 *Knowledge.* Applicant must have a practical and theoretical knowledge of flight instruction and pass a written and practical examination thereon.

20.412 *Experience.* Applicant may be a commercial or private pilot but in the latter case he must meet the requirement of § 20.35 (a) or (b).

20.413 *Skill.* Applicant must pass a flight test demonstrating his ability to perform with precision and to teach such flight maneuvers as are necessary and appropriate for instruction in the safe piloting of aircraft.

20.42 *Instrument rating.*

20.420 *Knowledge.* Applicant must pass a written examination demonstrating his familiarity with the use of such instruments and other navigational aids, both in the aircraft and on the ground, as are necessary for the navigation of aircraft by instruments. In addition an applicant who is a private pilot must meet the knowledge requirements of § 20.34 (a).

20.421 *Experience.* Applicant may be a commercial or private pilot but in the latter case must meet the requirements of § 20.35 (a) or (b). As part of the experience requirements, he must have logged at least forty hours of instrument flight under actual or simulated instrument flight conditions, not less than twenty hours of which must have been in actual flight.

20.422 *Aeronautical skill.* Applicant shall satisfactorily accomplish solely by reference to instruments a flight test of the following maneuvers:

(a) straight and level flight,
(b) moderately banked 180-degree and 360-degree turns in both directions,
(c) minimum glides and maximum climbs and approaches to stalled attitudes of flight,
(d) climbing turns,
(e) stalls, skids, slips, spirals, and banks in excess of 45 degrees,
(f) a demonstration of estimated arrival time, taking into account speed, wind, and drift.

20.423 *Radio skill.* Applicant must demonstrate his competence while flying under instrument conditions with respect to the following items:

(a) tuning radio,
(b) orientation,
(c) operation along a radio range leg,
(d) locating cone of silence,
(e) letting down toward the range station using the approved instrument approach procedure for the particular airport.

20.5 CERTIFICATION RULES

20.50 *Application.* Application for a pilot certificate or any rating must be made on a form prescribed and furnished by the Administrator. If an applicant applies as a graduate of a course of flight instruction approved by the Administrator the application must be accompanied by a certificate from the school or from the applicant's instructor made on a form furnished by the Administrator.

20.51 *Duration.* A pilot certificate other than a student pilot certificate will continue in effect until suspended, or revoked, or a termination date is fixed by the Board.

20.52 *Display.* A pilot certificate and rating record must be kept in the possession of the pilot at all times when piloting an aircraft, and must be presented for inspection upon the request of any passenger, any authorized officer or employe of the Administrator or Board, or any State or municipal official charged with the duty of enforcing local laws or regulations.

20.53 *Surrender.* The holder of a pilot certificate must, upon request, surrender such certificate to the Administrator, if it has been suspended or revoked.

20.54 *Exchange of certificates.* A pilot certificate which was effective on or after January 1, 1942, unless suspended or revoked, must be exchanged for a pilot certificate and appropriate ratings within six months after the effective date of this Part, except that any pilot serving in the armed forces of the United States may make such exchange within six months after date of discharge.

20.55 *Identification card.* An identification card is a part of a pilot certificate and must be kept in the personal possession of the pilot at all times when piloting aircraft. Such a card will be issued by the Administrator and will contain the pilot's fingerprints, picture, and signature or it may be a document issued by the Army, Navy, Marine Corps, or Coast Guard identifying the pilot as a member thereof.

Note: This requirement will be deleted after the war.

20.56 *Military competence.*

20.560 *Pilot certificate.* An applicant who is, or was within the preceding twelve calendar months, a member of the armed forces of the United States and has served on solo flying status for a period of six consecutive months shall be deemed to have met the aeronautical knowledge, experience, and skill requirements of the Civil Air Regulations for the issuance of a pilot certificate appropriate to the military pilot rating held: *Provided*, That he passes a written examination on Parts 20, 43, and 60 of the Civil Air Regulations and submits reliable documentary evidence showing:

(a) that he is a member of the armed forces or that he has been honorably discharged or returned to inactive status,

(b) that he is, or was, a rated military pilot, and

(c) his total solo flying time.

20.561 *Aircraft ratings.* Type, class, and horsepower ratings will be issued in connection with such a pilot certificate or in connection with a private or commercial pilot certificate held by the applicant, if he presents reliable documentary evidence showing that within the preceding twelve calendar months he has had at least ten hours of flying time during which he was the sole manipulator of the controls of aircraft of the type, class, and horsepower for which a rating is sought.

20.6 EXAMINATIONS AND TESTS

20.60 *General.* The examination and tests prescribed herein will be conducted by the Administrator or by a person designated for the purpose by the Administrator.

20.61 *Physical examination.* Within twelve calendar months immediately preceding the giving of the tests and examinations set forth herein, the applicant shall have passed satisfactorily the physical examination prescribed in Part 29 for the original issuance of a pilot certificate of the class for which application is made.

20.62 *Aircraft used in flight tests.* The applicant must furnish a certificated aircraft which must be equipped with complete dual controls and parachutes for both the applicant and the inspector.

20.63 *Passing grade.* A passing grade of at least 70 per cent must be accomplished on each flight maneuver and on each subject of written examinations.

20.64 *Time and place.* All examinations and tests will be held at such times and places as the Administrator may designate.

20.65 *Reexamination.* Applicants who have failed in any examination will be subject to the following rules in making application for reexamination:

(a) An applicant for a pilot certificate with a powered aircraft rating or for an additional rating who fails to pass any prescribed theoretical examination may reapply after the expiration of thirty days from the date of such failure or after he has received not less than five hours of instruction on each subject failed from a certificated ground instructor.

(b) An applicant for a pilot certificate with a powered aircraft rating or for an additional rating who has failed to pass any prescribed practical examination or test may reapply only after he has logged at least six additional hours of flight time under the supervision of an instructor holding the appropriate rating and after the instructor has certified in the applicant's logbook that he considers such applicant qualified for the rating sought.

(c) An applicant for a glider rating who has failed to pass any prescribed theoretical examination may reapply at any time after the expiration of thirty days or after he has received not less than five hours of instruction on each subject failed from a certificated ground instructor.

(d) An applicant for a glider rating who has failed to pass any prescribed practical examination or test may reapply only after he has made at least twenty additional gliding flights.

(c) An applicant for a glider rating who has failed to pass any prescribed theoretical examination may reapply at any time after the expiration of thirty days or after he has received not less than five hours of instruction on each subject failed from a certificated ground instructor.

(d) An applicant for a glider rating who has failed to pass any prescribed practical examination or test may reapply only after he has made at least twenty additional gliding flights.

Oliver L. Parks Announces the Opening of a Resident School of the Air for Young Women Exclusively, at the Alabama Institute of Aeronautics

This resident school of the air is for young women exclusively. It is in recognition of the dominant part to be played by young women in the age of personal flying. It is offered to young women who want to add Air Wisdom to their other accomplishments. Courses offered you in flight instruction and ground school training lead to a CAA Private Pilot's Rating in a 12 weeks' course of training.

Your flight and ground school training at Alabama Institute will be on the same colorful campus where, for the past 5 years, U.S. Army Air Force Cadet, Royal Air Force Cadet, Free French Cadet, Civil Pilot, and War Service Training have been given. You will study under the same competent, experienced instructors who successfully graduated 100% of the members of the original Civil Pilot Training class in 1939. You will have the advantage of the experience gained since then in flying over a quarter million hours in flight instruction.

For the 12 weeks of your training, you will live on the attractive school campus in comfortable residence halls.

Alabama Institute of Aeronautics — the resident flying school for young women exclusively — is an affiliate organization of the well-known Parks Air College for young men at East St. Louis, Ill.

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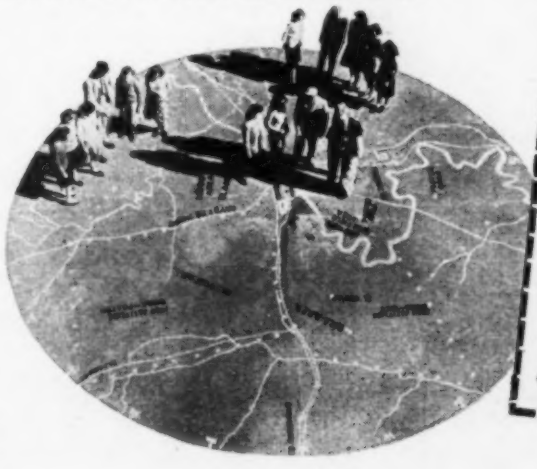

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AIR POWER *In Action*

By TOM ASHLEY

STRATEGIC air power action against Japan's teeming industries, which had to await much of the development and then quantity production of the B-29, developed with rising vigor during November. General H. H. Arnold was quick to back up the first raid on Tokyo targets with a statement that a major air offensive was in the making, that heavy bombing of industry within the enemy homeland would henceforth grow in intensity and regularity. It was no token raid, the chief emphasized; this was it.

A glance at the bomb-string at the left will add importance to General Arnold's statement. It shows how B-29 pressure, initiated last June against Bangkok and Yawata, idled through July (two actions), August (three missions), September (two), and October (four). Then in November the 20th Air Force gathered its might for nine B-29 missions between November 3 through November 29. Tokyo was hit three times in five days and more immediate bombings appeared on the way, particularly during early December.

The rapid speed-up in the B-29 drive against the Japs has deep significance beyond the fact that Tokyo has at last been brought within our range. It reflects, for one thing, the importance of Saipan, in the Marianas. This island base was held by the Japs only five months ago. Many months passed before friendly Allies could establish in England sufficient base facilities to allow major actions against Germany.

But as important as the Saipan base is, it is overshadowed by the possibilities of establishing even greater bases and more numerous ones in positions equally as advantageous and in some cases located nearer the enemy. If little Saipan can be so effective, the importance of B-29 bases in Russia will be tremendous.

★ ★ ★

Notes About Germany's "Gyrones"

Because censorship prevents more realistic discussions, about all the American public reads and hears concerning jet and rocket airplanes is the sensational side. Reaction-propelled planes are either too Buck Rogers-ish or else they aren't worthwhile—because of high fuel consumption, short range, low payloads or something else (latest "fault" we've heard is that jets blow out runways, allegedly disintegrating the paving and eating out holes).

But the fact remains that Germany not only has more than a few reaction-powered planes but is fighting with them in progressively larger numbers. Our enterprising British contemporary, "The Aeroplane," has gathered some interesting facts about the German jet and rocket fighters, and comes up with some important deductions. From "The Aeroplane," then, we pass on the following:

The queer little Messerschmitt Me-163 tailless fighter, powered by a single rocket (not jet) unit within the fuselage, and the Messerschmitt Me-262, powered by two Junkers Jumo 004 gas turbines, have been met in combat recently in increasing numbers. Another is the Heinkel HE-280, similar to the Me-262. The Me-163, which is nearly all wing and which is very small, has been described by U. S. Thunderbolt pilots as appearing to glide until attacked, suggesting its rocket power is used only intermittently. (Editor's Note: This is interesting, and recalls to us an interview with Alexander P. de Seversky about seven years ago, when he predicted reaction-propelled planes would go so fast their speed could not be measured in mph. but would be rated at "so much acceleration per minute;"

LOSSES IN THE AIR WAR
October 26-November 25, 1944
(Does Not Include Probables or Damaged Totals)

	Europe		Italy		Southwest Pacific		Russia*
	Enemy	Allied	Enemy	Allied	Enemy	Allied	Enemy
Oct. 26	2	6	....	1	14	1	19
Oct. 27	....	....	....	....	....	....	13
Oct. 28	....	11	....	....	10	....	15
Oct. 29	30	23	....	7	33	2	37
Oct. 30	....	8	....	....	36	....	50
Oct. 31	....	....	....	4	6	....	....
Nov. 1	3	9	1	7	11	....	17
Nov. 2	218	84	....	....	20	2	11
Nov. 3	3	7	....	2	37	....	....
Nov. 4	10	48	2	15	10	1	6
Nov. 5	....	37	15	12	68	4	5
Nov. 6	46	45	....	....	....	....	....
Nov. 7	....	....	4	26	8	1	6
Nov. 8	2	17	....	6	18	....	18
Nov. 9	15	21	....	....	43	....	....
Nov. 10	5	27	3	3	....	....	....
Nov. 11	....	5	21	14	20	10	....
Nov. 12	2	9	....	45	46	1	....
Nov. 13	....	....	....	12	....	....	21
Nov. 14	....	....	....	1	24	1	17
Nov. 15	....	3	....	6	13	....	10
Nov. 16	....	15	10	29	8	....	44
Nov. 17	....	14	....	21	5	....	55
Nov. 18	91	25	....	18	26	....	25
Nov. 19	16	23	....	21	10	4	25
Nov. 20	....	8	....	27	11	....	8
Nov. 21	79	48	....	14	7	....	7
Nov. 22	12	....	1	20	9	1	18
Nov. 23	....	5	....	3	1	....	70
Nov. 24	....	....	2	2	45	2	44
Nov. 25	3	23	....	4	27	4	12
TOTALS	537	521	59	320	566	34	553
Totals since Jan. 1	8034	7481	3916	3282	2630	354	13044

*RUSSIA: Does not reveal own losses.

CHINA: Fifty-four enemy planes destroyed at loss of twenty-eight. Totals since January 1, 809 enemy, 229 Allied.

PACIFIC: Nine hundred and forty-eight enemy planes destroyed at loss of twenty-four. Totals since January 1, 4,973 enemy, 413 Allied.

SOUTHEAST ASIA: Six enemy planes destroyed at loss of nineteen. Totals since January 1, 398 enemy, 232 Allied.

MIDDLE EAST: Two Allied planes lost. Totals since January 1, 77 enemy, 77 Allied.

(Note: These figures are compiled by SOUTHERN FLIGHT from daily headquarters communiques issued by the respective commands. They are, therefore, subject to periodic adjustment. Dates for Southwest Pacific are those on which figures are released; others when action occurred.)

For the Largest and the Smallest

There is a custom-built Humble-Esso Aviation fuel and lubricant for every type of craft from the largest to the smallest. Whether it's super-fuels for Super-Forts or utility fuels for Grasshoppers and Cubs, if it bears the Humble-Esso name it's a precision product made for dependable service.

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Humble-Esso Aviation Products

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TROUBLE FROM THE SOUTH FOR JAPS is symbolized by this scene of a Corsair fighter being landed aboard a British carrier somewhere in the Indian Ocean. British units are girding for a settling of accounts at Singapore, while U. S. forces seek to close the South China Sea between Luzon and Formosa.

reactive engines, he said, would be accelerated momentarily and then decelerated, accelerated then decelerated, and so on throughout the flight.)

Great speed (continues "The Aeroplane") also marks the twin-jet Me-262 fighter-bomber, which has become a frequent visitor around Arnhem and Nijmegen. The speeds it has attained in combat have suddenly surpassed the 500-mph. mark. But sharp maneuvering cannot be accomplished at full speed. When British Tempest fighters recently encountered two bomb-carrying Me-262's, escorted by three fighters of the same type, the whole formation turned as sharply as possible and sped away rather than mix it with the more maneuverable Tempests. Although the reaction-propelled fighter is not necessarily less maneuverable than its propeller-driven counterpart, the big point is that human physique cannot stand sharp maneuvering at high speeds. Still, observers say the Me-262 requires large turning radius even when throttled back, and is usually destroyed when attempting to mix it with Allied fighters.

Sheer speed on the part of the reaction-propelled fighters often results in hit-or-miss attacks on Allied bomber and escort formations, during which enemy pilots are fortunate to keep an Allied bomber in their sights for one-twentieth of a second. The Me-262 is reported reliably to be armed with four 30-mm cannon, which sounds devastating, says "The Aeroplane," but which actually offers the pilot only about five strikes per second, thus giving the Me-262's total armament only one strike in a twentieth of a second. Though rather theoretical, such figuring serves to illustrate some of the difficulties inherent in high speed combat.

Although "gyrones" (as reaction-propelled planes are called by our contemporary) are still in their early stages of development, the hard-pressed Germans have thrust their first examples into combat in an attempt to brighten the Luftwaffe's dull prospects. Their reaction-propelled losses have been small, but their achievements have been smaller, concludes "The Aeroplane."

★ ★ ★

USAAF Combat Record

A total of 638,880 tons of bombs were dropped by the U. S. 8th and 15th Army Air Forces on European targets between August, 1942, and October 31. Heavy bombers dropped 330,000 tons of the total inside Germany itself.

During the same period the 8th, operating from British bases, and the 15th, operating from Italy, destroyed 12,650 enemy aircraft in the air and 2,570 on the ground for a total of 15,210. The two U. S. Air Forces lost a total of 8,157 aircraft, less than 2 per cent of the total airplanes dispatched against the enemy. American losses included twice as many bombers as fighters, the figures being 5,708 bombers and 2,449 fighters.

The 8th began operations from the British Isles in August, 1942, and the 15th initiated operations from Italy in November, 1943.

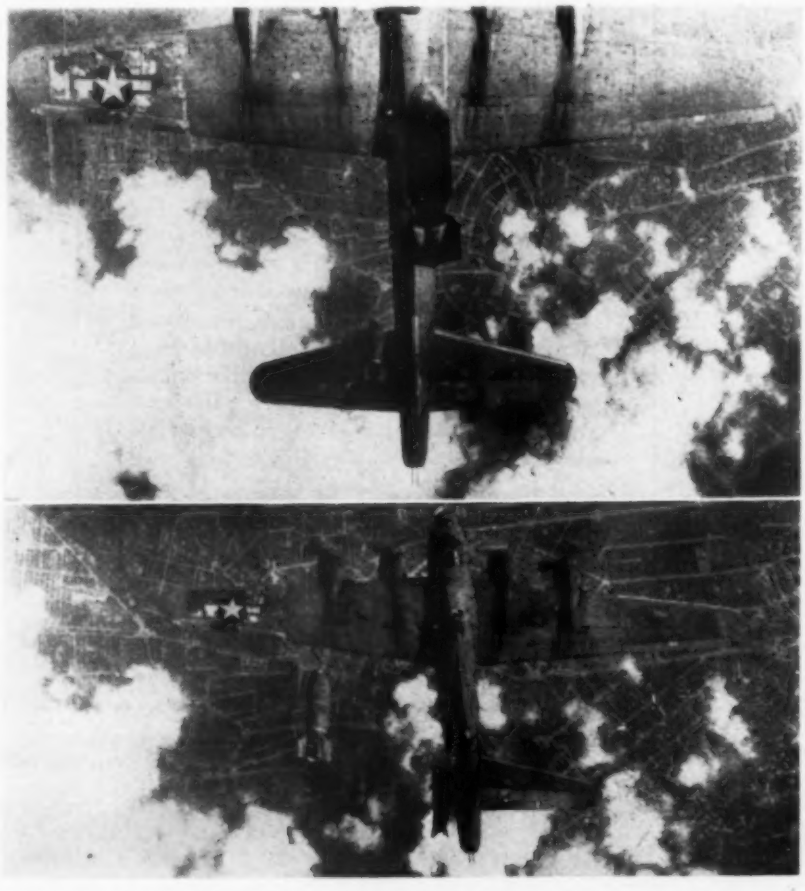
★ ★ ★

All in a Day's Work

"Shot down five Jap bombers and eleven fighters. . . . destroyed four Jap bombers on ground. . . . blew up a locomotive. . . . destroyed trainload of gasoline. . . . shot up three railroad cars crammed with Jap troops. . . . strafed a 60-ft. gunboat. . . . damaged a motor launch."

So runs the record of a single afternoon's operations in China by sixteen planes of Brig. Gen. Winslow C. Morse's Chinese-American Composite Wing, 14th Air Force. Chinese pilots of the unit were credited with twelve and one-half Jap planes, American pilots with seven and one-half.

★ ★ ★



TRAGEDY IN THE MAKING was photographed recently during a U. S. bombing mission over Europe. Top photo shows bombs plummeting from one B-17 into lower element of the formation. Note first bomb near left stabilizer of ill-fated bomber. A second later it struck the stabilizer, crumpling it (bottom photo).
—(Boeing Photos.)

BOOK REVIEWS

Damned To Glory, *by Col. Robert L. Scott, Jr., published by Charles Scribner's Sons, New York City, price* $2.50.

This book by the author of "God Is My Co-Pilot" brings together a collection of little-known stories as a tribute to the courageous fighter pilots of the first year of the war. Included are gripping accounts of the fabulous "Bamboo Fleet" of the Philippines, of Pearl Harbor and Dutch Harbor, Tunisia, and episodes from the air battles in the Solomons, in Java, in China, in Africa and in the Aleutians.

Colonel Scott, himself a P-40 pilot in General Chenault's China Air Task Force, again takes the reader into the air with the men who fly the ships. It is a book for every American—tense in its drama, vividly real and human in the picture it gives of a score of genuine heroes.

The Coming Air Age, *by Reginald M. Cleveland and Leslie E. Neville, published by Whittlesey House, McGraw-Hill Bldg., New York* 18, *N. Y., price* $2.75.

Blueprinting tomorrow's aviation world, this book should help answer the everyday questions about the airplane and its impact on our future way of living. It discusses the geography of the air, freedom of the air, airlines of tomorrow, and sky freighting, including descriptions of the giant superplane, the helicopter, the rocket ship, and new power sources. It is an authoritative, realistic book about the practical future of aviation.

To be published by the Infantry Journal this month is the little-known story of how America's mass air force was created. Written by Willard Wiener, magazine writer and author of "Morning in America," the as yet untitled book tells just how the Army Air Force was able to expand its output of trained pilots more than 200-fold in less than five years. It records achievements from the day General H. H. Arnold first sensed that war clouds were lowering over Europe down to the latest raids over Berlin and Japan.

Comfortization of Aircraft, *by Albert A. Arnhym, published by Pitman Publishing Corporation, 2 West 45th St., New York* 19, *N. Y., price* $7.50.

Mr. Arnhym has assembled in his book all the technical data, calculations, information and illustrations necessary to aid in eliminating the discomforts inherent to flying. The various phases of comfortization for commercial and military aircraft are outlined, together with procedures and methods for incorporating, specifying, selecting and servicing comfort equipment. Three hundred and forty-seven pages, illustrated.

NEW LITERATURE

Parks Air College, *Parks Air Port, East St. Louis, Ill.,* has just published an attractive, profusely illustrated brochure describing the three Parks organizations and giving a complete picture of the aviation training opportunities offered by their several schools. Two new Parks' enterprises—Parks Air Transport, Inc., and Parks Aircraft Sales and Service—are described in this brochure.

Piper Aircraft Corporation, *Lock Haven, Pa.,* has produced an attractive new booklet, entitled "How to Fly a Piper Cub." In it are included many full-color photographs of the Piper Cub models, a complete nomenclature of the airplane and its controls, and many informative pages that will prove of interest to pilots and non-fliers alike. One whole section of the booklet is devoted to over fifty step-by-step pictures and descriptions of an actual flying lesson.

A copy may be obtained from the Piper Aircraft Corporation for the postage-handling cost of ten cents.

Romec Pump Company, *Elyria, Ohio,* has issued an illustrated bulletin on their new RD-5200A Engine Driven Fuel Pump (formerly Army Type G-9.)

Pratt & Whitney, *West Hartford, Conn.,* have just issued a new circular which gives completely up-to-date information on their Air-O-Limit Gages of various models. It is titled "Gaging With Air by the Pratt & Whitney Air-O-Limit Method," Circular No. 479.

Richmont, Inc., *P. O. Box* 6450, *Metropolitan Sta., Los Angeles* 55, *Calif.,* has issued a twelve-page illustrated booklet covering Livermont Torq-Stop Tools, designed to answer the problems of proper torquing during manufacture, assembly and manufacture of aircraft and other products.

Chief, Navy Bureau of Aeronautics, *Navy Department, Washington, D. C.,* has available a manual of instructions and parts catalog for Surface Combustion's "Janitrol" aircraft heaters; or it may be obtained from the Commanding General Fairfield Air Service Command, Patterson Field, Fairfield, Ohio, attention publication distribution branch.

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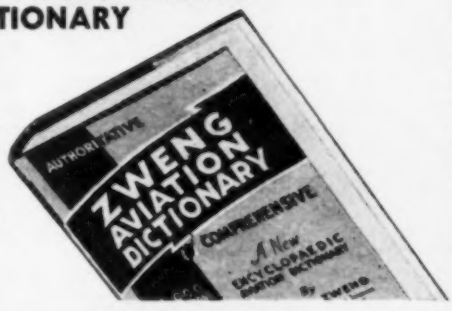

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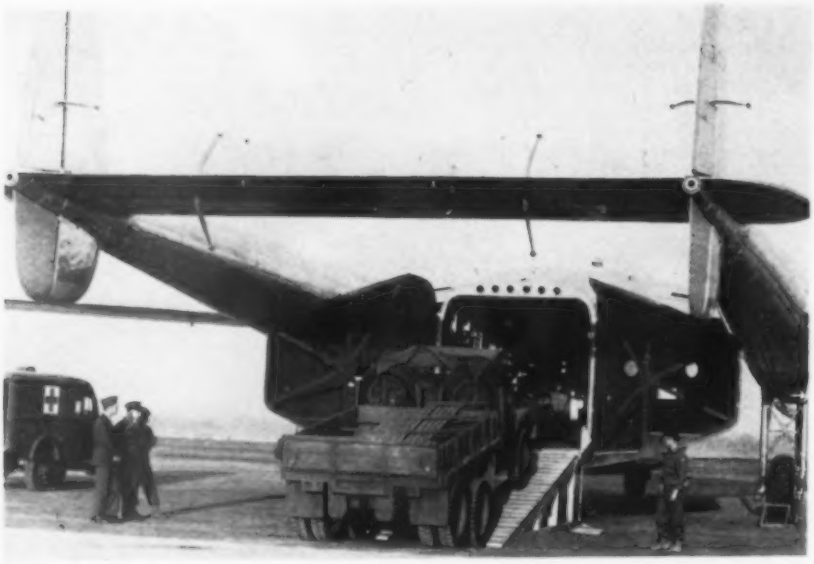

ROOM FOR 10-WHEEL, 2½-TON TRUCK in Fairchild's C-82 Packet is demonstrated by this rear view of the twin-boomed craft. Note functional design of cabin, rear doors. —(Fairchild Photo.)

Lower Transport Costs Forecast at Clinic

By E. H. PICKERING

It is time for the airlines to add work clothes to their wardrobes and get down to the business of engaging in mass transportation. This was the gist of a paper prepared by CAB Chairman L. Welch Pogue and delivered to the Oklahoma City Clinic by CAB Member Oswald Ryan.

Stating that "the will to achieve" and the close co-operation of all parties is essential for low cost air transportation, Pogue said, "The aircraft manufacturing industry cannot pioneer a transport plane with low operating costs unless the air transport industry thinks not only in terms of air transportation as a luxury form of transportation but also in terms of its being a form of mass transportation."

Air mail can and will be taken out of the luxury class by Congressional action, Pogue declared. The movement of all first class mail by air can be absorbed by the carriers with little difficulty, so slight would be the increased load.

Pogue expressed concern over the future of air freight unless the industry begins to believe in low cost transportation, getting away from luxury rates. If such a change occurs, then air freight can be expected to become the greatest potential source of growth in air transportation. There must be a strong enthusiasm on the part of the airlines to develop the air cargo business to the maximum.

In 1942 the Civil Aeronautics Board predicted a volume of 6,000,000,000 passenger miles in 1946, Pogue pointed out, continuing with an expression of concern that this volume would still not be very much in view of the potentials of mass transportation. Pogue warned that the potential as viewed from the standpoint of diversion from existing surface traffic was not great. Of the 454,000,000 passengers carried by the railroads in 1940, approximately half were commuters travelling an average 17.4 miles, and 91 per cent of the remainder were coach passengers travelling an average 60.7 miles. This leaves only 20,000,000 Pullman passengers travelling about a 400-mile average, and for this business the railroads can be expected to offer stiff competition.

Pogue believes, therefore, that the diverted surface traffic will be small in comparison with entirely new traffic which can be developed. A little over fifty years ago the per capita travel in the United States was well under 100 miles a year. It is more than that a month now. Between 1920 and 1930 the per capita travel doubled and redoubled. "The facility for travel creates travel," stated Pogue, pointing to the fact that remoteness is a matter only of time and cost. The airplane has reduced this time element, it now remains to reduce the cost.

Merchandising by Air

Speaking extemporaneously in one of the most forceful presentations of the entire clinic, James Wooten, Cargo Traffic Manager of American Airlines, stated that the potential in air freight is limited only by the ability of the airlines to market the service. His remarks were limited to air freight as can be carried in DC-3 type equipment with costs of $1.00 per plane-mile (25 cents per ton-mile including passenger handling premiums).

"Leave the garbage where it is grown," said Wooten, in speaking of perishables. Let the grower prepare his product in readiness for cooking or serving and market it under his own brand name. Glamorize it, put in some leg art, and sell a new product, is Wooten's theme. Fresher than ever, with new flavor, new food value.

In covering the shoe industry, Wooten pointed out that pre-war merchandising of women's shoes saw 80 per cent of a store's revenue coming from only 40 per cent of the stocks. The remaining 60 per cent of the stocks suffered drastic markdowns as styles and seasons changed. But during the war this industry made a seven-time greater profit than ever before in the face of a poorer product, 40 per cent less production, and price ceilings. The profit came from the fact that the entire stock could be sold without markdowns. And Wooten claims that air freight will continue this economic possibility by permitting the store's purchase of three pairs of shoes of a single style instead of three dozen, and overnight replacement of his stocks.

The cost of this service with DC-3 operation would be about 55 cents per pair of shoes—up 35 cents over previously used rail express—on a coast-to-coast basis, but the store, eliminating necessity of markdown, would average additional 65 cents net profit per pair of shoes.

Wooten distributed cellophane bags of Texas-grown chopped raw salad vegetables which were crisp and tasty after a test journey of 1,800 miles by air freight.

In the discussion that followed, Dr. John H. Frederick of the Universty of Texas supported Wooten's contentions and predicted a revolution in marketing and distributing methods that will affect practically every industry.

Pick-up Pays U. S. Profits

In a talk on feeder airlines and air mail pick-up service, Hal Bazley, president of All American Aviation, Inc., showed his company as being on a non-subsidy basis with post-office revenues exceeding payments to the carrier. In refutation of repeated remarks concerning feeder airline service being necessarily more than fifty miles between points, Bazley pointed out that the points served by AAA were only fourteen miles apart on a system average.

Three Routes Granted

Three new routes were granted by the Civil Aeronautics Board during the past month to Western Air Lines, American Airlines, and Braniff Airways.

The bitterly contested Denver-Los Angeles route was awarded to Western Air Lines, in a close decision reversing the recommendation of the examiners. Intermediate stops will provide service to Las Vegas, Nevada, and Grand Junction, Colorado. Applications of United, TWA, and Continental were denied.

American Airlines was granted permission to shorten its transcontinental route by flying from Nashville to Tulsa to Oklahoma City to El Paso, saving some miles over the route via Dallas and Fort Worth.

Braniff Airways got a new extension eastward from Oklahoma City to Tulsa, Muskogee, Fort Smith, Little Rock, and Memphis.

Additional CAB actions changed Chicago and Southern's temporary permit to serve Little Rock enroute to Houston to a permanent certification, and added Joplin, Missouri, to American Airline's Chicago-Dallas route on a permanent basis.

CAB Conference for Non-Scheduled Services Set

The Civil Aeronautics Board has tentatively set February 12, 1945, as a date for the beginning of a prehearing conference on non-scheduled air services. Those with applications for service pending and all interested parties are encouraged to attend and express their views either orally or in exhibits. Participation by those in a position to assist the Board in a full development of all related facts will determine the success of the investigation.

Interested parties should notify the Board of their intention to participate at the earliest possible date.

Charter operators, in particular, will be af-

(Continued on page 104)

THE DOUGH YOU BLOW —will bring U.S. woe!

What a boom we were handed by World War No. 1! Money came easily—went easily. Everybody was splurging on everything—from silk underwear to diamond sunbursts. Prices went skying. Sugar eventually hit 28¢ a pound!

Bye-bye, boom. Factories closed; men laid off. Prices and wages sinking fast. Wish we'd banked some of that dough we'd blown a few years back! With jobs scarce, that money would have come in mighty handy, then.

Prosperity. Stocks up fifty points in a week. Again everybody was buying everything—yachts, jewelry, stocks, real estate, regardless of cost. Depression? Phooey . . . we thought we'd found a way to lick depression.

Or had we? Bread lines, apple venders. WPA. "Brother, can you spare a dime?" No jobs. Prices dropping. Wages dropping. Everything dropping—except the mortgage on the house. "What goes up must come down."

We're splurging again. Americans have been earning more money. But even today there are fewer goods to spend it on—so naturally prices rise. We must keep them in check. DON'T LET *IT* ALL HAPPEN AGAIN!

---

4 THINGS TO DO to keep prices down and help avoid another depression

1. Buy only what you really need.
2. When you buy, pay no more than the ceiling prices. Pay your ration points in full.
3. Keep your *own* prices down. Don't take advantage of war conditions to ask for more—for your labor, your services, or the goods you sell.
4. *Save.* Buy and hold all the War Bonds you can afford—to help pay for the war and insure your future. Keep up your insurance.

A United States War message prepared by the War Advertising Council; approved by the Office of War Information; and contributed by this magazine in co-operation with the Magazine Publishers of America.

Boeing's B-29 Order Upped 1,000 Planes

Boeing Aircraft Company last month received an additional contract for 1,000 more B-29 Superfortresses, bringing the firm's backlog of unfilled orders to about $1,145,000,000 and calling for full-capacity operation of its Seattle and Renton plants and their branch factories well into 1946. The order followed an earlier contract for 700 more B-29's from the Boeing Airplane Company at Wichita, Kansas.

Labor shortages were facing Boeing with a new serious angle involved, the firm said. B-29 production was described as involving "many types of work" which only men can perform. Whereas at least 50 per cent of the B-29 workers should be men, and preferably 55 per cent, Boeing's women workers have increased from 53 per cent of the total last January to 57 per cent at present.

Large Contracts to Boost Convair Expansion Program at Ft. Worth

Contracts totalling $1,478,000 are still to be awarded in a $3,000,000 expansion program under way at Consolidated Vultee Aircraft Corporation's Fort Worth division, which is steadily increasing B-32 Dominator production. The entire project is to be completed by February 28, 1945, with exception of additional yard paving, which will be completed by June 1. Contracts yet to be let include additional yard paving, $1,250,000; cafeteria addition, $150,000; sprinkler for GFE warehouse, $50,000; and sprinkler systems for north and south ends of engineering building, $28,000.

A large addition to the plant's experimental building was recently completed at a cost of $1,440,000.

Curtiss Establishes CW-20 Sales Unit at St. Louis Plant

The Curtiss-Wright Corporation's Airplane Division, following up its recent unveiling of the commercial version of the CW-20 Commando, last month announced new assignments in the sales promotion section of the St. Louis plant's contracts department, setting up a staff in charge of sales promotion of the twin-engine airliner.

Named to the staff, headed by Marvin J. Parks of St. Louis, were G. Sumner Ireland, Eastern representative; T. D. Harvey, Southeastern representative; C. K. Travis, export representative, and R. F. Wolford, mid-western and western representative.

E. A. Warren is contracts manager and F. T. Sterling is assistant manager of the St. Louis contracts department.

Factory-Made Houses Using Aircraft Technique Planned by Beech

Beech Aircraft Corporation has announced plans for postwar mass production of "Dymaxion dwelling machines"—described as a new type of factory-made housing utilizing aircraft technology, materials, skills, tools and facilities. Such houses, the firm said, "may prove of great benefit to the Army and Navy in the Japanese war," but are being planned chiefly to utilize Beech facilities in Wichita, Kansas, following the war.

One of the houses is now under construction, it was said, and is built chiefly of aluminum, steel, rubber and plastics. Composed of units capable of assembly-line production in any modern aircraft factory, and, assuming equivalent floor area, it can be shipped in less than one-quarter the space now used for shipping materials for an ordinary house, or in less than half the space used in shipping a prefabricated house. Its parts, including foundation, can be assembled on the site, with the house ready for occupancy in "a matter of hours," according to the Beech announcement.

Postwar house production would augment Beech's aircraft program, which will include twin-engined transports.

Joint Termination Regulation Completed

A new joint Army-Navy termination regulation covering all aspects of fixed price contract settlements has been completed and provides guides, recommendations and mechanical aids for reaching speedy and equitable settlements. It is a loose-leaf publication of about 300 pages, to be supplemented at intervals, and was prepared by the military services. It can be requested from the Joint Termination Regulation Distribution Office, 6th Floor, 90 Church Street, New York 7, N. Y.

Aircraft Production Board Membership Listed by Krug

J. A. Krug, chairman of the War Production Board, has announced the membership of the Aircraft Production Board. Besides Krug, who is chairman, the members of the APB are Lt. Gen. William S. Knudsen, Director, Air Technical Service Command, AAF; Maj. Gen. Oliver P. Echols, Asst. Chief of Staff for Materiel and Services, AAF; Rear Admiral Lawrence B. Richardson, Asst. Chief, Bureau of Aeronautics, Navy Department; T. P. Wright, Administrator, Civil Aeronautics Administration; and Myron A. Tracy, Recorder, Acting Director of the Aircraft Resources Control Office and Recorder, APB.

1,730 Planes of Three Types Built in October by NAA Factories

Two aircraft production records during October were established by the combined facilities of three North American Aviation, Inc., plants. The plants produced 1,730 complete planes and equivalent spare parts. The California Division's production of over 500 P-51 Mustangs and parts equal to 125 more was the highest delivery record for one model ever made by a single plant. Army Air Forces accepted 1,453 completed airplanes, and component parts for 277 planes for a grand total of 1,730 aircraft, which is believed to be the highest ever achieved in one month by a single plant.

U. S. PRODUCTION OF AIRPLANES AT A GLANCE

July, 1940, through December*, 1944

		Total July, 1940-Dec., 1944	July-Dec., 1940	1941	1942	1943	1944
Bombers	Number	82,453	626	4,119	12,637	29,362	35,709
	000's Lbs. Airframe Wt.	1,257,901	5,669	40,573	163,050	425,151	623,458
Fighters and Naval Reconnaissance	Number	82,547	1,162	4,940	12,240	24,739	39,466
	000's Lbs. Airframe Wt.	420,891	3,756	17,776	54,100	126,254	219,005
Transports	Number	19,792	164	533	1,984	7,013	10,098
	000's Lbs. Airframe Wt.	196,614	1,160	3,776	18,257	55,496	117,925
Trainers	Number	56,309	1,808	9,366	17,632	19,942	7,561
	000's Lbs. Airframe Wt.	126,531	3,201	18,089	39,158	47,053	19,030
Communication and Special Purpose	Number	13,749	10	501	3,367	4,874	4,999
	000's Lbs. Airframe Wt.	10,539	13	930	2,000	3,407	4,189
Total All Planes	Number	254,850	3,770	19,459	47,860	85,930	97,831
	000's Lbs. Airframe Wt.	2,012,476	13,799	81,144	276,565	657,361	983,607

*Actual through August, scheduled program for balance of 1944.

ATSC Procurement Unit Simplified for Control

An integrated reorganization which centers in a single procurement division of the Air Technical Service Command the functions of buying and supervising production and inspection of aircraft for the Army Air Forces has been announced.

Brig. Gen. Orval R. Cook, head of the division, said that the purpose of the unit was to help AAF headquarters determine what types of aircraft can be produced in quantity to meet the Army's current and anticipated needs, and to procure from the 15,000 manufacturers in the aircraft industry the 450,000 items which the AAF requires, and see that the schedules and specifications are met. To accomplish these duties, General Cook has divided the divisions into three sections: Resources Control, Production and Quality Control. This compares with fourteen sections for the same work under the former Materiel Command.

World's Largest Camera at Ft. Worth Plant

The world's largest box camera is operated at Consolidated Vultee Corporation's Fort Worth plant. It is large enough for three persons to work inside while full-sized drawings are being photographed and is the only air-conditioned photographic equipment known. The base is eight by fourteen feet, and the box is approximately thirty-six feet high. The film, held to the top of the huge camera by a vacuum, is printed on four by eight feet sensitized photographic paper or transparent tracing cloth, and the finishings are done in the regular way with normal photographs. The main purpose of this camera is to produce tracings which will make good, legible blueprints and at the same time eliminate countless hours of hand tracing.

30 Chinese Engineers to Study at Lycoming

Thirty Chinese nationals will be given a year's training in production work and specialized occupations at the Lycoming Division of the Aviation Corporation at Williamsport, Pa. The training is covered by agreement and contract between the Commission on Aeronautical Affairs of the Republic of China, the U. S. Army Air Forces Air Technical Service Command and the Lycoming Division. After the year's schooling, the group will return to China to supervise the manufacture and assembly of Lycoming engines there.

Technological Advances in Aviation Cited by Chamber

The aircraft industry's technological development has advanced three times the normal rate under the stimulus of war-created emergencies, according to the Aeronautical Chamber of Commerce. Improvements in wing design have increased speed and reduced the drag, one new wing shape reducing drag more than all previous research in aviation history. Weight per combat horsepower has been cut 40 per cent, while stamina and endurance have improved. Recent advances in the field of metallurgy provide metals of sufficient strength and heat resistance to make practical the application of jet propulsion to combat aircraft.

Ground Recorder for Flight Test Data

A flight recorder, an electronic "brain" which helps pilots test new airplanes, has been invented by flight engineers of Consolidated Vultee Aircraft Corporation. It comprises a self-operating radio transmitter and receiver, the transmitter being installed in the plane while the receiver is kept on the ground. Throughout the test flight the transmitter sends instrument indications to the receiver which records the results on a graph, indicating what is going on in the plane at all times. The device is particularly valuable in testing small fighter and pursuit aircraft, while it is not so accurate in the larger planes at the high altitudes. The "electronic brain" provides a continuous record of the stresses, pressures, temperatures and other conditions to which an airplane is subject in flight.

Convair Building 350-mph. Wind Tunnel, Laboratory

An aeronautical laboratory, including a 350-mph. wind tunnel and an air flow laboratory, has been planned for installation at Lindbergh Field, San Diego, according to I. M. Laddon, executive vice president of Consolidated Vultee Aircraft Corporation. Although of medium size, the project will incorporate the most modern developments and will provide facilities for testing models having wingspans up to ten feet. The facilities for the wind tunnel will also be available to other local manufacturers for research purposes. The new tunnel will have a working section eight by ten feet in size and have a maximum section of twenty by thirty feet.

In addition to the wind tunnel, the new laboratory will include an air flow laboratory for testing air ducts, a complete model shop and engineering office space. Construction of the laboratory has already started.

Millions Spent Monthly for Military Rockets

Rocket power is a big business now, according to G. Edward Pendray, assistant to the president of the Westinghouse Electric and Manufacturing Company and secretary of the American Rocket Society. Addressing the Harvard Engineering Society and the Harvard Club of New York, he said that with the Navy spending $100,000,000 a month for rockets, and the Army asking for an appropriation of $150,000,000 for them, and with millions being spent for research and development of jet propulsion planes, rocket power can no longer be looked upon as a dream for the future; it is here now.

Pendray explained that there are now at least four kinds of engines and motors operating on the principle of jet propulsion, or rocket power; these are the dry fuel motors, the liquid fuel motors and two known as the "airstream engines"—the thermal jet engines and the duct engines. He explained that rocket motors and jets employ a jet of rapidly expanding gas to provide the push with which they propel airplanes. Pendray said engineers may eventually build a 1,500-mile-an-hour plane, such planes flying in the stratosphere, and may be powered by a combination of gas turbines, thermal jet engines and true rocket motors.

Nashville Delivers Its First P-38

The Nashville Division of Consolidated Vultee has produced its first P-38 Lightning fighter plane. This plant has been retooling since the early part of the year for full-scale production of the P-38.

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Airplane Wings Being Fabricated of Magnesium

Airplane wings, fabricated entirely of magnesium, have been in flight for more than a year on North American SNJ Naval training planes according to J. C. Mathes of the Dow Chemical Company in a speech before a meeting of the American Society of Mechanical Engineers. Mathes pointed out that magnesium is one-third lighter than aluminum, and that the present average fighting plane utilizes about one-half ton of this light metal.

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75,430 Radio Compasses Delivered by Bendix

Bendix radio division of Bendix Aviation Corporation has delivered a total of 75,430 radio compasses to allied forces since Pearl Harbor, according to William P. Hilliard, general manager of the company. A total of 87,830 compasses have been produced since they first were introduced as a mainstay of aerial navigation.

Buick Builds 60,000th Pratt & Whitney Engine

The Buick division of General Motors Corporation has produced its 60,000th Pratt & Whitney Wasp engine, according to Harlow H. Curtice, general manager. The company has accelerated output to meet new schedules involving two new types of engines of greater horsepower and performance, one for Liberator bomber production and the other for the large Douglas C-54 military transport, Curtice added. Buick now builds the Pratt & Whitney R-1830 for Liberators, a 1,200-horsepower fourteen-cylinder twin-row radial engine, and the transport version of this engine used in twin-engined Douglas C-47 military cargo planes.

30,000th Autopilot Built by Honeywell

Minneapolis-Honeywell Regulator Company has announced completion of the 30,000th electronic automatic pilot for precision bombing. The first unit was installed on a Flying Fortress, January 1, 1942. Since then the autopilot has been used on B-17s, B-24s and the new B-29s. The autopilot, used to hold bombers straight and level during the course of their bombing runs, is capable of making more than 300 flight corrections a minute.

Ft. Worth Gets Tool Engineer

The appointment of Paul Mitchell as assistant chief tool engineer at Convair's Fort Worth division has been announced by Chief Tool Engineer Charles Marvin. Mitchell was formerly chief tool engineer at the Allentown, Pa., division where he set up the tooling program on the TBY-2 torpedo bomber. He was transferred at the Fort Worth plant's request.

New Plating Rack

A new type plating rack does away with the individual hanging of numerous small parts and at the same time assures that the surface to be plated faces the anode, has been developed by Frank Rohr of the Glenn L. Martin Company. This guarantees uniformity of metal deposit and provides a safe, efficient means of draining parts as they are removed from the baths while protecting the operator's hands and clothing from the solutions. The basic design of the rack is a tubular metal frame work across which wire mesh is stretched. The mesh covered frame is attached to another piece of pipe by two arms with pivots slightly above mid point so that it can be easily tilted in either direction.

Jet Engine Easy to Install, Lubricate

The jet propulsion plane has only one moving part in its power unit, making oil consumption negligible, according to General Electric engineers. The one moving part rotates without very much vibration and it can be supported on anti-frictional bearings, keeping the oil from overheating. A thermostat has been devised to maintain the oil at proper temperature under varying degrees of cold at high altitudes. The power plant for the jet plane is a "packaged" unit which is easily installed; since there is little vibration, the unit can be tied to the airframe.

Record Claimed for 4-Hour Engine Change

A new field record for completely changing the engine of a B-24 Liberator was set at the Fort Worth Army Air Field last month. The work of changing, inspecting and servicing the engine for a test run was completed in only four hours, and the total time from the beginning of the job to the delivery at the hangar was six hours. Included in this total elapsed time was a thirty-minute test run, with the necessary adjustments, final test run by inspectors, recowling and delivery of the plane.

HS Props on A-26

The Douglas A-26 Invader is the 75th type of United States warplane to use Hamilton Standard propellers during the present war. The propellers are three-bladed Hydromatics, 12 feet 7 inches in diameter, geared to one-half the rpm. of the 2,000 horsepower Pratt & Whitney engines.

Slot Milling Speeded Up

Workers at the Glenn L. Martin Company, Baltimore, have made a simple device by which two slots are now being milled in less time than it formerly took to machine one. Under the old method of milling two slots in an angle brace, it was necessary to line up the milling machine table individually for the cutting of each slot. The new way just added a holding plate to an adjustable drill head, and mounted on the machine. This permits both slots to be milled at one time, saving 62 per cent in time required for the operation.

Enters Home Radio Field

Lear, Incorporated, formerly Lear Avia, has postwar plans of entering the home radio field. Arthur Kudner, Inc., is managing the advertising campaign.

Lear originated the radio frequency unit for automatic, razor-edge tuning, popularly known as the magic brain. Lear has also made innovations in compact and lightweight design and construction of airplane radio equipment.

Firm Changes Name

The Acme Pattern and Tool Co., Inc., Dayton, has changed its corporate name to Acme Aluminum Alloys, Inc. The reason given was the change in production scope of the twenty-five-year-old firm. Acme Aluminum Alloys, Inc., are manufacturers of heat-treated aluminum alloy castings and are one of the five largest in the U. S. The firm will continue the pattern, tool and die departments as well as the design and engineering service, company officials said.

NEW PRODUCTS

Low Pressure Hydraulic Seal

The Weatherhead Company of Cleveland, has announced a new fitting known as the low pressure Q-A fitting for instrument and low pressure hydraulic hose lines. Said to satisfy a condition whereby higher pressure effects a tighter seal between hose and fittings, the seal varies proportionally with the pressure carried. From the design, which involves an assembly of stem and coupling nut, plus a free sleeve nut, is derived a floating seal. Hose is run onto the stem, provided with an annular hump, and because of wide-angle gripping threads, the sleeve nut becomes a part of the hose. As pressure is applied it forces the stem out and pulls the hose and tapered sleeve nut against the stem hump. According to the company, the new fitting is reusable either on new or original hose.

Sheet Metal Hardness Tester

The Glenn L. Martin Company, Baltimore, announces the development of a mechanical device for testing and automatically certifying the hardness of sheet metal parts, which was designed and built by an inspector, A. Vleck, Jr. The new device has saved more than 1,505 man hours at the Baltimore plant. Known as the Martin Hardness Certifier, the new machine was devised as a means of increasing accuracy in measuring hardness of aluminum alloy parts. It consists of a flat-topped base member which serves as a working table on which the parts to be tested are placed in an upright support rigidly secured to the base and an arm supported by the upright which affords a mount for the stamp mechanism —comprising a plunger and operating solenoid. The tester is of conventional form, is automatic and said to remove all possibility of accidental error.

Navigator Calculator

A new celestial navigation calculator, called the Starmaster, is now being manufactured by the Spiral Slide Rule Co., Chicago. Designed for the sole use of spherical triangles found in celestial navigation problems, it has two distinct scales, one in colored bands for multiplying or dividing function of angles, and one in white bands for combining certain results from operation on the colored bands. Colored bands, which are interlaced with the white bands, are alternately green and yellow and the numerals are in bold type, for locating proper angles. For each problem the instructions reduce to a few rules and with practice, determination of altitude can be made in one and one-half minutes and of the azimuth in two minutes. Other solutions are said to be equally fast.

Rot-Proofing Process Available

A patented process for rot-proofing aircraft fabrics, owned by the Roxalin Flexible Finishes, Inc., of Elizabeth, N. J., has been made available as a free process for the duration, company officials announced, for companies who are required by the Navy to use the process. The company said that the fabric-finishing method extended by many months the life of planes operating in tropical climates where heat and humidity stimulate fungi growth, causing deterioration of the fabric-covered parts of a plane. Called Emycel fabric finishing system, it is a spray process which is said to accomplish in four coats of finish, the same results other processes acquire in seven or eight coats of finish. It employs high solids and viscosity material which reduce to a low viscosity for spraying, by the application of heat.

Thymo-trol Cuts Milling Time

Finishing time in machining aluminum spar beams for plane wings has been reduced from thirteen and one-half hours to five minutes at a Cleveland aircraft plant with the help of General Electric Thymo-trol installed on a large automatic contour milling machine designed and built by the Onsrud Machine Works, Inc., of Chicago.

Radio Noise Suppressor

A radio-noise-suppression capacitor, designed to reduce radio-noise voltage from generators, inverters, motors and other equipment, has been announced by the General Electric Co. Called Pyranol, the capacitor is said to be effective in reducing radio noise at higher frequencies. The new unit is a through-stud type; operates on A-C or D-C; from 0 to 100 amperes with a maximum voltage of 250. The capacitor is compact and weighs four and one-half ounces. It is said to be suitable in moving temperature range of plus 50 C to minus 50 C.

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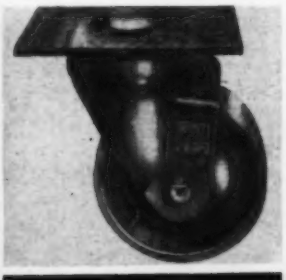

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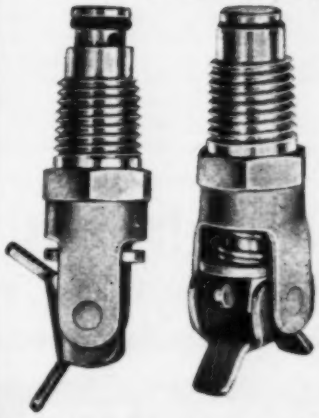

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PERSONALS

FREDERICK JOHN KNACK has been named vice president in charge of engineering for Luscombe Airplane Corporation, Trenton, N. J. Knack recently resigned from Fairchild Aircraft Division. . . . JAMES S. FARRA has been appointed service manager of the Douglas Aircraft Company. Farra moved up from his former position as assistant to the plant manager of the Douglas Chicago plant, succeeding Don Sprague. . . . H. WEBSTER CRUM, blimp pilot and former manager of airship control of Goodyear Aircraft Corporation, has become manager of Goodyear's new products division. . . . ROBERT CRABB has been assigned as field engineer of Pacific Division of Bendix Aviation Corporation. He was formerly eastern sales representative. . . . J. R. HARRISON has been appointed factory superintendent of the Miami division of Consolidated Vultee Aircraft Corporation, being transferred from Elizabeth City, N. C.

T. KELLY PIERCE has been named general manager of the Duramold Division of Fairchild Engine and Airplane Corporation. . . . HARRY S. SUTTON has resigned as director of engineering of Consolidated Vultee Aircraft Corporation, San Diego. . . . J. L. STUART, formerly a consulting engineer with Anaconda Copper, has joined the technical staff of Sperry Products, Inc., to handle technical writing. . . . TOM GULLETTE, formerly with Wright Aeronautical Corp., has become associated with Burke Dowling Adams in advertising and merchandising. . . . COL. HORACE A. SHEPARD has been made acting chief of the production section in the procurement division of the Air Technical Service Command. . . . WARDEN GREEN is now superintendent of the Newark, Ohio, plant of Goodyear Aircraft Corporation. . . . CAPTAIN JOHN SHERMAN, newly named liaison consultant to the Civil Aeronautics Board, replaces HOWARD B. RAILEY, recently named Civil Air Attache to the American Embassy in Paris.

J. W. CLEAVELAND has replaced J. L. MASTERSON as southwestern sales manager of the Finished Division of E. I. duPont de Nemours & Company in Dallas. Masterson has been transferred to the main offices in Wilmington. . . . JOHN W. VALE, JR., has been appointed director of training of Aero Industries Technical Institute, Los Angeles. . . . F. C. THIEME is now assistant to the president and chief engineer of Robinson Aviation, Inc., New York, N. Y. . . . ORIN REDHEAD is now manager of the Columbus, Ohio, office of Aero Insurance Underwriters. . . . GEORGE L. WILEY has been named welding consultant to the Big Three Welding Equipment Company, Houston, Texas. . . . Aeronautical Chamber of Commerce last month announced appointment of VICTOR G. MELLQUIST to its technical staff. . . . WILLIS AHLBORN KROPP, industrial design engineer and stylist, has joined the Aircraft Parts Development Corporation, Summit, N. J.

Stanley Woolams

ROBERT M. STANLEY has been named chief engineer of the Niagara Frontier Division of Bell Aircraft Corporation, and JACK WOOLAMS, twenty-seven-year-old pilot who conducted high altitude tests on the jet propelled P-59A, has been named chief test pilot of the same division by Bell.

DON BALFOUR, formerly factory superintendent of the Nashville Division of Consolidated Vultee Aircraft Corporation, has been named works manager of the plant, succeeding ERNEST WENIGMANN, who became acting division manager. . . . HUGH H. JOHNSON has moved to Arthur Kudner, Inc., from the post of director of advertising for Bell Aircraft Company. . . . JULIUS ZIMMERMAN is now superintendent of salvage of Consolidated Vultee's Miami Division.

E. A. Kurzawa Joins Dolan Aircraft Company

Edward A. Kurzawa has joined the staff of Dolan Aircraft Manufacturing Co., Dallas, as chief engineer. Formerly connected with Consolidated Vultee Aircraft Corporation in San Diego and New Orleans, Kurzawa is in charge of development and design. He was graduated in Aeronautical Engineering from the University of Michigan. Dolan manufactures precision parts for aircraft.

C. W. Perelle Appointed to TWA Directorship

Charles W. Perelle, vice president in charge of manufacturing of the Hughes Tool Company of Houston, Texas, and general manager of the Hughes Aircraft Company plant in Los Angeles, has been elected a director of Transcontinental & Western Air, Inc. The board also appointed M. W. McQueen assistant treasurer. Jack Frye, president of TWA, declared that Perelle would bring to the board years of experience as a specialist in aircraft manufacturing.

Fletcher Joins ATSC

Kenneth S. Fletcher has become administrative assistant in the public relations section of the Boston Area Office of the AAF Air Technical Service Command, Kimball Bldg., 18 Tremont St., Boston, Mass. He was formerly with the public relations office of Bell Aircraft, Niagara Falls, N. Y.

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After all, you're safe and sound and *home*. *That's worth another hundred-dollar bond to you, isn't it?*

Buy at least one extra $100 War Bond today!

Southern Flight

This is an official U. S. Treasury advertisement—prepared under auspices of Treasury Department and War Advertising Council.

AIR TRANSPORT

(Continued from page 96)

fected by the results of this investigation. No place for the hearing was designated.

Airship Advantages Stressed

In order to keep the field open to use of lighter-than-air ships, P. W. Litchfield, president of Goodyear Aircraft Corporation, has appealed to the Civil Aeronautics Board to take no action that would prejudice their eventual inclusion in international trade. Claiming that airship ton-mile operating costs over long routes would be half to a third that of the airplane, Litchfield pointed out that the airship could still offer speeds three to four times as great as the steamship. Although no commercial airships are available, Litchfield believes companies would be found ready to operate airships to be built after the war.

Foreign

Pan American World Airways has requested from government authorities concerned permission to operate night flights between Mexico and Guatemala. This would permit evening departures from Brownsville and noon arrivals at the Canal Zone. The United States Maritime Commission is taking steps to intervene in CAB hearings on applications of steamship companies for air routes. The Commission does not actively favor any one company, but wishes to speak for the right of surface carriers to protect their present interests in order to maintain an adequate Merchant Marine. Three surplus Douglas transports are being converted by Aero Services, Inc., Van Nuys, California, for TACA. Two will be passenger versions, one a freight plane.

Air Freight

The SAE Air Cargo meeting, held in Chicago, December 4-6, featured talks by Harry S. Pack of PCA, J. A. Wooten, W. C. Lawrence, and H. E. Hoben of American Airlines, Carlos Wood and A. B. Croshere of Douglas Aircraft, Jared B. Morse of Boeing, Charles Graddick of United Air Lines, Charles Froesch of Eastern Air Lines, A. W. French of TWA, and Thomas Wolfe of Western Air. . . . Delta Air Lines has appointed Paul W. Pate as superintendent of a newly created air cargo department. . . . Colonel Edward S. Evans of Evans Products Company, Detroit, suggests that all air shipments should be stenciled with net weight and gross weight in order to reveal need for reboxing to eliminate excess weight.

Differences Debated at International Conference

Airline and foreign affairs interests from most of the United Nations and non-belligerents gathered in Chicago last month to form basic understandings for future international air transportation developments.

American and British interests were principally at loggerheads over the question of unbridled or regulated competition on the routes. American demands for each country to operate whatever number of schedules necessary to accommodate the traffic met severe dissension from British interests favoring an international agency to establish traffic quotas over specified routes.

Latin-American interests seemed unified in demands for something approaching equal representation for small countries in the voting powers of any international body that might be established. Russia withdrew, complaining over participation of Spain and Portugal.

One subject on which most interests seemed in agreement was the formation of an international conference to establish safety and operational requisites. The conference was scheduled to close on November 30.

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Life Insurance Firm Recognizes Air Safety

At long last an insurance company has "recognized" air travel. On the applications of Connecticut General Life Insurance Company will no longer appear the question, "How many trips on commercial airlines do you make a year?"

Full coverage at no extra premium is now offered by this company. Simultaneously, the company announced liberalized insurance rates to airline crews and to private fliers.

In announcing the more lenient policies, Frazar B. Wilde, president, stated, "It is just common sense that life insurance underwriting should keep pace with the truly extraordinary advances made in aviation."

CAB Studies Multiple Taxation of Carriers

A two-day session to discuss burdensome multiple taxation of air carriers was held in November. Under the sponsorship of the Civil Aeronautics Board and directed by Member Oswald Ryan, representatives of the airline industry, state and local tax administrations, the Federal government, and universities and tax associations agreed that solution would probably be found in Federal-State co-operation and that Congressional action might have to be taken toward this solution. No definite date was set for a continuance of the meeting.

AAF Termination Experts to Aid Manufacturers as Well as U. S. Agencies

Efforts by the Army Air Forces to speed contract settlement and reconversion to civilian production were stressed in a statement by Maj. Gen. Bennett E. Meyers, deputy director of the Air Technical Service Command, at his headquarters at Wright Field, Ohio. The ATSC is training more than 3,000 carefully-selected officers to handle the complicated details of contract termination; the officers receive training at such places as the Harvard School of Business Administration and the Army Industrial College in Washington, D. C.

"We are not only training qualified men to handle the Army's part of the termination job; we are also offering to manufacturers all the information at our disposal that will help them in winding up the contracts on their own end," General Meyers said.

25,000 Planes Built by Consolidated Vultee

Consolidated Vultee Aircraft Corporation has produced more than 11 per cent of all military and naval aircraft since Pearl Harbor, a total of 25,000 airplanes by number and 16 per cent by weight, Harry Woodhead, president, announced. The company has also delivered spare parts amounting to more than 4,000 equivalent airplanes. Expressed in terms of airframe weight, Convair's aircraft and spares production aggregates more than 300,000,000 pounds. There are more B-24's fighting on the world's battlefronts than all other types of American-built "heavies" combined, including super-bombers.

Eastern Orders 14 Constellations, National 4

Contracts have been negotiated between Lockheed Aircraft Corporation and Eastern Air Lines for fourteen Wright Cyclone powered Constellations for delivery when available. Four Constellations have been contracted for by National Airlines.

Eastern's models will be convertible forty-eight-passenger day planes and thirty-four-capacity sleeper. National will have each plane different, ordering a convertible, a sixty-four-passenger "coach" version, a club version with lounge and bar, and an "inter-continental" version.

These Constellations will be capable of easily maintaining such schedules as New York-Washington, one hour, New York-New Orleans, four and a half hours, New York-Boston, less than one hour, New York-Miami, four and a half hours, New York-Atlanta, three hours, New York-Mexico City, eight and a half hours, Lockheed said.

Brazil to Build AT-6 Texan Planes

The Brazilian government has been granted license to manufacture the AT-6 Texan advance trainer by North American Aviation, Inc. The Texan has been built in greater numbers than any other airplane in aviation history. Also produced in Canada and Australia, the Texan is used by twenty-eight different nations. The Brazilian Ministry of Aeronautics will be provided with enough sets of the component assemblies to build a number of airplanes, and sufficient parts to complete additional airplanes. Drawings and specifications will be furnished the Brazilian ministry, along with flight test data, engineering reports, operations sheets, and other data to enable the Brazilians to gain sufficient experience to produce the planes. Brazilian production men recently completed a three-month visit to the Dallas factory of North American Aviation.

Dallas Plant Not to Build Superfort Parts

A revision of plans has resulted in the decision not to build parts for the B-29 Superfortress at the Dallas plant of North American Aviation, according to H. F. Schwedes, division manager. This decision will not affect the number of personnel originally scheduled to be maintained in the plant, for work of another type, as yet undisclosed, will be substituted.

Kansas City Engine Output is Expanded

Over 1,200,000 horsepower was shipped during November from the Navy's engine plant at Kansas City operated by Pratt & Whitney Aircraft Corporation of Missouri, representnig a gain of 200,000 horsepower over the previous month. General Manager L. C. Mallet said the plant, producing R-2800-C engines of 2,100 hp. each, must jump its peak output an additional 250,000 horsepower over previous schedules by November, 1945, and maintain that level until the Japanese surrender. Four thousand men will be added to the payrolls.

Navigation Boon to Private Flying Developed by CAA in All-Direction, Static-Free Radio Range

Static-free very high frequency radio ranges, which will register the bearing of an airplane on an instrument in the cockpit, have been developed by the Technical Development Division, Federal Airways Service of the Civil Aeronautics Administration, and are now going through final testing. The new ranges will send course signals in all directions from the station, and are also equipped for voice.

This type of air navigation facility makes it possible for the private pilot of a small airplane, with inexpensive, light-weight radio receiver to navigate by radio anywhere in the country without extensive training in its use, the CAA said. In flight, the pilot can select any desired compass course by setting a pointer on a 360 degree compass-type dial. So long as the course is maintained, the vertical pointer on another dial remains centered. Deviations are indicated to the right or left up to 10 degrees on the dial.

Should the pilot stray far off-course, he can determine immediately his bearing to any station within receiving range by centering the vertical pointer and reading the bearing on the scale of degrees. He can also take bearings on two or more stations and pinpoint his position by cross-bearing methods.

Demonstrations are being given airline pilots and further refinements are in progress.

Laister-Kauffmann Sees Airlines as Glider Operators

Postwar gliders for serving towns and communities which are too small to afford long runways are in the offing with the acquisition of the assets and design rights of the Bowlus Sailplane Company of Los Angeles by the Laister-Kauffmann Aircraft Corporation of St. Louis. In announcing the merger, President Jack Laister said that before 1950, cargo passenger "pick-up" gliders would be supplementing the large airlines in serving the smaller towns and communities. The craft proposed will employ the engineering data and design of the Bowlus eight-passenger and fifteen-passenger gliders, acquired under the merger. The company is developing a glider with a greater pay load in comparison to its size than any existing craft. Late in November the St. Louis firm flight-tested its secret new CG-10A, designed for the Army. It carries forty-two fully armed men including pilot and co-pilot.

Six More Contract Schools Closing AAF Training

The Army Air Forces have advised six additional primary contract flying schools that their training operations will be discontinued on or about December 28. Schools due to close are Eagle Field, Dos Palos, Calif.; Ryan School of Aeronautics, Hemet, Calif.; Midwest Air School, El Reno, Okla.; Southern Airways, Inc., Decatur, Ala.; Darr Aero Tech, Inc., Albany, Ga.; and Raymond-Richardson Aviation Company, Douglas, Ga.

NACA Engineer to Give Wright Brothers Lecture

Commemorating the forty-first anniversary of the first flights of the Wright Brothers at Kitty Hawk, N. C., John Stack, chief of the Compressibility Research Division of the Langley Memorial Aeronautical Laboratory of the National Advisory Committee for Aeronautics, will present the eighth Wright Brothers Lecture of the Institute of the Aeronautical Sciences. Stack will speak before members and guests in the U. S. Chamber of Commerce Auditorium, Washington, D. C., December 17, 1944. The subject of the lecture will be "Compressible Flows in Aeronautics."

AT-6 Replaces BT-13 in AAF Basic Training

Lt. Gen. Barton K. Yount has announced that 550-hp. AT-6 training planes are now being assigned to basic pilot schools throughout the AAF Training Command's network of flying schools to replace the BT-13 Valiant basic trainers. The AT-6 has long been the standard trainer for the advanced schools. The 450-hp. BT-13 has been the standard trainer for the basic or intermediate phase for all student pilots, both fighter and bomber.

NAA Made U. S. Wing of Inter-American Escadrille

The National Aeronautic Association has become the United States Wing of the Inter-American Escadrille, an organization of private fliers and others in the American Republics who are interested in civil aviation. The affiliation effected an invitation from Alfredo de Lee Rios, founder of the Escadrille, and has the approval of Nelson A. Rockefeller, Co-ordinator of Inter-American Affairs. Offices in the United States will be set up at NAA headquarters; Blanca Palacios, formerly staff member of Pan American Union, will be in charge.

Carlstrom Field Tops Contract Schools in Safety with 192,224 Hours Flown, No Fatalities; Cuero, Eagle Field Cited

An Aeronautical Training Society safety survey among member contract flying schools, which have conducted all of the primary flight training for the AAF, shows that the best records made during 1943 were at Carlstrom Field at Arcadia, Fla., with 192,224 hours flown and no fatal accidents; Brayton Flying Service at Cuero, Texas, with 135,082 hours flown and one fatal accident; Eagle Field at Dos Palos, Calif., with 156,128 hours flown and one fatal accident. Five other schools had no fatal accidents, but none of them equalled the hours flown by the winners in their respective Army commands. They are: Lodwick School of Aeronautics, Inc., Lakeland, Fla.; Raymond-Richardson Aviation Co., Douglas, Ga.; Southern Airways, Inc., Decatur, Ala.; Twenty-nine Palms Air Academy, Twenty-nine Palms, Calif.; and Anderson Air Activities, McBride, Mo. Winning school in any command to fly the longest without a fatal accident is Carlstrom Field, operated by Embry-Riddle Company.

The survey showed that safer flight training is in prospect because of wartime experiences.

Aeronautical Training Society has acted as liaison agency for these schools, plus some which have done basic instruction, and others which have taught British, French, Dutch, Brazilians, Mexicans and Chinese to fly, plus WASPS and Artillery Observation Officers. Totaling Navy, Marine and ATS schools and civilian schools, ATS declares that the United States will go into a postwar era with about one-half million people in the country knowing how to fly.

Representatives of the winning schools winning awards and certificates of merit by reason of flight instruction safety will be brought to Washington for official recognition and receive scrolls recording the achievement. The awards will be presented by J. Wendell Coombs, president of Aeronautical Training Society.

Last "Forwarder" Produced by Fairchild

The last Fairchild UC-61K "Forwarder" came off the main Fairchild assembly plant at Hagerstown, Md., last month. The first "Forwarder" was made in September, 1941, as a modified Fairchild 24. It is a four-place utility-cargo plane, with an ability to use small airfields for landing, and late models carried 200 hp. It was a popular plane before the war, and Fairchild officials plan to offer an improved model to private fliers after the war.

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CAP Cadets of the 1st Group, Colorado, service and maintain army liaison type planes assigned to their squadron. —(Photo by Lt. W. Todd.)

CAP Only Source of Pre-Trained Reserve for U. S. Air Power

Since Army Air Forces suspension of Air Corps Enlisted Reserve recruiting, the Civil Air Patrol cadet program is the "only means at present of building up a reserve of pre-trained young men for the maintenance of American air power," Col. Earle L. Johnson, AAF, national commander of CAP, said on December 1 in a statement marking the CAP's third anniversary. He listed CAP strength at 125,000 adults and cadets, and approximately 75,000 former members are now in the armed forces. Cadet strength is expanding at the rate of 10,000 per month.

Citing CAP accomplishments, Colonel Johnson said fully a third of the 1,600 airports now open to civilian pilots would not be operating or would have been closed during the war had it not been for CAP activities, which built eighty-one airports and made major improvements to over 100 others at no cost to the government.

Pre-flight Instructors Eligible for C Book

The Office of Price Administration has declared Civil Air Patrol pre-flight instructors eligible for preferred gasoline ("C" rations), but they may be granted preferred mileage only for travel to and from the place where pre-flight instruction is given to CAP cadets. Applications must be certified by a liaison training officer of the AAF assigned to the CAP program. The Army requested the action, to facilitate training of 250,000 cadets in pre-flight courses.

CAP "Bombs" Leaflets To Promote 6th War Loan

The town of Piqua, Ohio, got off to a good start on the Sixth War Loan campaign. The first day a Civil Air Patrol plane "bombed" the city with 30,000 leaflets urging the purchase of War Bonds. The leaflets were headlined "This Could Have Been a Bomb" and persons finding ten marked ones received a $25 bond. The idea was suggested by Dale Westfall, employe of Lear, Incorporated, in Piqua.

Texas Wing to Air-Mark 500 Towns in Paint Campaign

In a move to make Texas the first completely air-marked State in America, Civil Air Patrol units with the approval of the War Department and technical aid offered by Civil Aeronautics Administration, have launched a program to air-mark 500 Texas towns.

Air-marking consists simply of painting the name of a town on the roof of one of its prominent buildings, so that the sign can be read from airplanes passing overhead as high as 3,000 feet or more.

Major R. L. Bowen stated that the air-marking in Texas will be of the nature of a test-tube for the nation, and the lessons learned will be applied to air-marking in the rest of the country.

An air-marker painted on a huge railroad cotton shed made Plano, Texas, the first community to be marked in Texas since the war started.

In air-marking Plano, several CAP members first banded together to form an air-marking team. They studied a set of detailed instructions prepared by Blanche Noyes, air-marking specialist of the CAA. They then made an aerial survey of the town, picked out the best building for the sign, and secured permission from the Cotton Belt Railroad to paint "PLANO" on the roof. This took one day. The next day the team appeared on the site with paint contributed by a Dallas paint retailer, with brushes loaned by a CAP member, and, with some chalk and string, two of the men started laying out the ten-foot letters with chalk lines on the roof. Directly behind them came a third man with paint and brush to daub in the big yellow letters. As soon as the two layout men completed their plan, they took up brushes and joined in the painting. Actual laying out of the sign and painting took only 80 minutes from start to finish.

Civil Air Patrol has prepared sets of instructions for standardized air marking, which are being distributed to CAP units all over Texas. Each unit will have an air-marking team which will function much the same as the Plano team did—going into various nearby towns, selecting prominent buildings, securing permission to air-mark them, obtaining the materials, and painting the signs. Chambers of Commerce and civic clubs are co-operating with CAP in this work. When the job is completed, possibly six months from now, Texas is expected to be the first completely air-marked state.

"I do solemnly swear that I will bear true faith and allegiance to the United States of America, that I will serve them honestly and faithfully against all their enemies whomsoever, and that I will obey the orders of the President of the United States and the orders of the officers appointed over me, so help me God," is the oath this group of Kalamazoo cadets had just taken when photographed. W/O C. Baden, CAP, administered the oath.

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Due to the paper shortage, thousands of CAP members have been unable to obtain copies of this Handbook in previous editions. Now the WPB has authorized SOUTHERN FLIGHT to print an additional 15,000 copies, and the new, revised edition will be off the press in December.

Orders are pouring in and 15,000 copies will not supply the demand. However, it is all we can print at this time. So we advise you to reserve your copy at once.

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By TONY HAGMANN

If students don't come to the airport . . . the airport can fly to the students. At least this is the case at McKinney, Texas, which has a standing population of about 8,500 and a large G. I. Hospital, but which, at this writing, has no municipal airport. But that doesn't stop the flying citizens of McKinney. They shopped around and found an out-of-town airport manager, N. T. Womack, who was interested in their plight, and the plight of his instructors who did some airport sitting. An instructor or an airplane doesn't make a dime when not flying, and here was an opportunity for a couple of ships to be ticking off a few extra hours, and dollars.

Womack, who is not a pilot, operates Mustang Airport at Dallas for his brother, who is flying high-powered Navy ships over the Salt Run from San Francisco to assorted islands in the Pacific. He is a business man, who thinks the idea of making money on an airport is not repulsive. Mustang Airport is breaking a shade better than even.

They found an agreeable farmer with a nice plot of well-sodded ground suitable for flying and lined up about fifteen students. Most of the students were from the government hospital, due in some measure to one Major V. J. Buck. Major Buck started to fly in Jamestown, N. D., a couple of years back and wanted to get his private license. He talked it up and soon some of the patients were interested, several doctors, WAC officers and a few of the civilian workers were all steamed up to learn to fly from Farmer Maynard's backyard.

Twice each week one orange Cub and one blue and yellow Aeronca would announce their arrival by flying over the hospital, and at regular half-hour intervals out to the farm would come a student.

One day we left Mustang with Dee Bishop, instructor, in a tandem Aeronca trainer and in twenty minutes landed at McKinney. There were two cows on the 1,500-ft. landing spot we'd picked, but they were off side and didn't count. There was a fifty-gallon barrel of gas, some bricks, and one nicely mannered police dog. In a few minutes we saw the dust of an approaching car, bringing Major Buck, the first student. We asked him if he intended buying a plane after the war. He replied: "When? Why, I have a low bid in on one of those Army planes now. Of course I'd rather have a new one."

We met Colonel John Harvey, chief of the medical service, from Lexington, Ky., who is interested in a family plane, "one that will carry about four." Next a pretty Red Cross nurse, Ruth Adams, in uniform, who had a bad cold in her head and asked us not to take her picture, but said she came from a flying family. She has two brothers who fly and she said: "I want to learn to fly for the same reason I had to learn to drive a car. When I couldn't drive I couldn't have the car. And we're going to buy a plane when it's over."

Tulsa, Oklahoma—*On Tour with Tony*—knowing how early it is all Sunday morning, we prayed our way on American Airlines' earliest flight where Hostess R. Housewright awoke us gently with a cuppa strong black and package of chaw. We pow-wowed with

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our co-passenger Lt. Elwood Welch about Big Chief Airplane and agreed it was probably here to stay. Welch has been flying on the West Coast for many years, has many hours. (LA papers please note) O. M. "Red" Mosier, of American Airlines was on the same flight, Oke City bound.

Tulsa Airport is run by Charlie Short. Everybody knows that, but few know about his Yellow Dog, fewer have met the Indian. We met no Indians but made the dog house. Dogs lead a wonderful life. Charlie, too.

Bert Monesmith, assistant manager at Douglas-Tulsa, scooted us through the amazing factory where they turn out A-26's like butter out of a churn. Ex-bankers, cotton pickers, wives, pretty dolls, all building on this great airplane. We met J. C. Carroll, test pilot, on the flight line and watched Major Dick Cole fly over the field so fast our face fell open down to here. They should call it the Royal Flush. It's a War Winner, for sure.

At Spartan Aircraft, we met George Waller who builds the Waller radio line of communications. George was "QST-ing" with Art Pavey, who flies a Beech for the Noble Drilling Corporation of Ardmore, and was about the busiest radio man we've met. He not only builds 'em, repairs, "de-bugs" 'em and guarantees the job, he is working on some mighty fine deals for the postwar period.

We sat in with R. G. Ojers, in the Instrument Division of Spartan, and learned about modern methods of instrument overhaul. They not only have instruments for everything but thinking, they are whippin' up one that will almost tell us when the ducks are going to fly south. We ordered one. Tom Neal, assistant director, said Spartan had an Executive to offer the private pilot which would make your mouth water, coming right up. And Henry Miller, shop co-ordinator, complimented SOUTHERN FLIGHT for "a fine job of aviation news" so we puffed up and left, but we'll be back. Just "bye" for now.

Phoenix, Arizona— *Marjory Hardman*— Well, there are quite some people who would like to have an instrument rating, but here are a few who recently made the grade at Southwest Airways under the able guidance of Art and Bess Bethancourt: Dick Robbins and George Miller, now with American Airlines; Bernardine King, who is a tower operator here now but is a name familiar to many; and Jerry Conley, now completing ATC training. Jimmie Barrett, Ted Widemayer, Jack Coyner and L. S. McClain are "on the verge"! Bob Wilcox wants his private ticket so that he can shoot aerial pictures at leisure. Lory Bolon, Bob Walberg, James Lucas, J. L. Rose, James Taze, W. L. Bruce, Allen Bragg and Ralph George all aspire to hold private licenses. Former instructor Bruce Bethancourt is now in the Army Air Corps and stationed at Sheppard Field, Texas. Page Deuel, who had to "siesta" for a couple of months, is up and about again. Pat Sexton, Virginia Gray, Carol Benton and Barbara Connell, all members of the Mustang Club, are flying at night in one of the Cubs belonging to Southwest Airways.

C. E. Fowler and Hugh Hutchinson, flight instructors at Marsh & Franklin, may add a couple of notches—private tickets now are held by Barbara Hartman, William Spritsman, W. D. Clark and D. J. Hill. Maury Wilson, ground instructor, will soon release others as prey for pouncing CAA Inspectors LaFeevre and Barber! (Really not as bad as they sound!) Bill Marsh, Hubert Dolap, and William Wilcox have kept the big bad boll-weevils from Cotton's door and are now busy saving vegetables in order to guarantee the slogan "Food will win the war."

"Ben-J" Cahill, of Sky Harbor Air Service, always knows all the details of those interesting incidents that are always occurring around an airport the size of Sky Harbor. Seems that

"... and THOSE are the brakes!"

Lee McWilliams forgot he was in his Luscombe rather than an automobile and jammed on his brakes when the airplane taking off, for which the control tower had told him to watch, appeared suddenly. George Goforth was flying Dr. Dan Ferrill's Culver when the locking pins of the landing gear gave 'way on take-off, making the ship skid on its belly, but causing no injury to the pilot.

Bob Hope and Jerry Colona gave autograph seekers a break when they stopped here. A Lockheed 12 belonging to the British West Indian Airlines and piloted by First Officer McVickar, a former RCAF pilot, landed here en route from Trinidad to the Lockheed factory. Willard Hoaglin, of Hoagland Aircraft Motor Company of Glendale, Calif., dropped into Phoenix on his way home from an extensive air tour; itinerary included New York and Canada. This little jaunt was made in his Fairchild 24 and took two or three weeks.

Phoenix is now one of the regular stops of the NAT, and the city of Phoenix is behind the USO canteen being planned on the field. The prefabricated hangar now being erected at Sky Harbor is nearing completion and soon all the "widdle airplanes" that now stand out in the wind and the rain will have some protection.

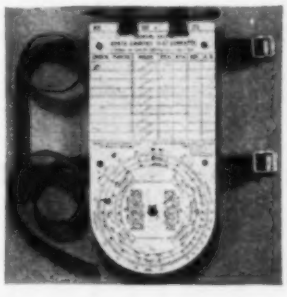
Members of the Phoenix squadron of the Civil Air Patrol have been busy going on search and rescue missions—attending meetings and classes. We have more to live up to now that our Wing Commander has been promoted to the rank of Lt. Colonel—congratulations, Col. Frank Beer. Captain Mike Mitchell, Ben Cahill and Don Keller went to Los Angeles in Don's Waco on business.

The mountains are getting purple—so it is time to go for now. Maybe next time we can tell you how the drop tests run on Dave Gold's new type parachute succeeded.

Birmingham, Alabama — *From Edith Wideman*—Southern Airways president, Frank W. Hulse, and CAP Wing Commander Lt. Col. Harold Wood attended the Oklahoma City meeting . . . knowing the kind of meetings Steadham Acker directs they did not want to miss the clinic. Hulse recently accepted an important appointment made by Eric Johnston, U. S. Chamber of Commerce . . . as member of the Transportation and Communication Committee of that organization.

Airport "toors" are being conducted for the younger generation by Southern Airways. These tours were offered to Aviation classes in the City High Schools. To date several classes have taken advantage of this opportunity. Ercoupe Tyler (Bill, to you) gave two prize demonstrations to the most observant members of one of the classes . . . right then and there he sold the "winnahs"—well, almost! "Doc" Eaddy is now Assistant Manager of Southern Airways Airport operation here. He has an aviation background revving up and taking off from the barnstorming days.

Aviation writer Glenn McNeil hied into town . . . we hadn't seen him since the last National Air Carnival and he really brought accumulated aviation news from Tennessee. All Birmingham is agog over the news that Paul W. Pate has been appointed superintendent of the newly created Air Cargo de-



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partment of Delta. . . . In the Delta system's recent report it showed Delta's load factor for the month of October was one of the highest in the country. . . . Colonel Laigh Parker, a Delta vice president, is now overseas . . . La France . . . still on priorities and such.

Gloria Jean and accompanist flew into Birmingham on the way to Northington Gen. Hospital in Tuscaloosa to morale-build the recuperating vets there. . . . After a "blamed" good job of it they took off for Texas via Delta's Flight 2.

Experiences recounted at Birmingham Aero Club luncheon by RAF Wing Commander Currant (hmmm with a delightful British accent, too) held members spell-bound.

Captain Eddie Rickenbacker is heading the guest speaker list on Eastern Air Lines Day at the Aero Club soon. . . . He is to appear at a banquet that night of the Municipal Employes Asso. where he'll present Steadham Acker with the Jimmie Jones Merit Trophy. This trophy is awarded annually by the Assn. to the city employe accomplishing the most outstanding work for Birmingham's benefit over and above the employe's required duties. Nice work, Steadham!

Eastern, Delta and PCA employes have determined that the Yule Season shall not be too dull, in spite of the war, so they are planning a joint Christmas party. . . . Sez they: "It'll take the form of a chicken barbecue, dance and beer bust."

Official guests aboard PCA's Capitaliner making its first stop in Huntsville, Alabama, a newly added stop on PCA's Birmingham to Pittsburg route, were Birmingham City Commissioner Jas. W. Morgan; Lt. Col. J. E. Getzen; State Director of Aeronautics E. W. Stanford; and Miss Marguerite Johnston of the Birmingham News. This is the first commercial air transport to serve Huntsville and the localities really turned out. In connection with PCA's inaugural flight Southern Airways dedicated the city-county owned airport which it operates there.

Colonel Warner B. Gates was farewelled in style before his transfer and Birmingham Army Air Base welcomes Lt. Col. Clarence E. Hodge as new commanding officer. Our best wishes go to both of these gallant gentlemen . . . May all their landings be happy ones.

THE FLYING STANTONS—Captain Stanley T. Stanton (center), pilot for TWA's Intercontinental Division, and his two sons, who are following in their father's footsteps. Lt. I. M. Stanton (left), a resident of Platte County, Missouri, is an Air Transport Command pilot flying with the ATC out of India. His brother, James, of Clay County, Missouri, is a captain in the domestic wing for TWA. Seventeen years an airline pilot, Captain Stanton has logged more than 2,000,000 miles and flown the Atlantic more than 100 times.

—TWA Photo.

Kansas City, Missouri —*by Marion Melcher*—What! Nothing liquid in my hand! After that Aviation Clinic in Oklahoma City none of us will ever be quite the same. But it was fun—plus the fact that we feel the Clinic ironed out some problems.

Kansas City was well represented—as everyone knew who attended the Clinic . . . for our City Manager, L. P. Cookingham, had something to say . . . and there was no keeping John Wilson of NATA off of his feet when he found an opening. Bill Ong was seated near our good friend from Omaha, Rudy Mueller. E. Lee Talman, genial as always, made more friends in Oklahoma City, and Dr. Herold C. Hunt, our superintendent of schools, made a point on aeronautical education.

And just in case you're wondering why I haven't mentioned any women in the Kansas City Unit of the WNAA, it's 'cause I was catching my breath to say that some of them flew down to the Clinic . . . like Neva Rea and Marie Tracy, and still others of us came up on that Kansas City Special on the night of the 14th: Willi Williamson, Jewel Stanton, Esther Wirthman, Bertha McCartney, Goldie Gooding, Eunice Mecaskey and your reporter. Among those we met on the train were: Dick Murray, Bill Brown, Ed Johnson, the Morton Joneses. And several days later one of our notables inquired seriously: Did anyone ever find Eunice's hat?

Oklahoma City— With helicopters hovering like hummingbirds on the Capitol lawn, long and well-known names scattered around like rice in Houston, speakers on "red hot" aviation subjects . . . B-29's at Tinker field close enough to touch 'em . . . food at the officers' club, so delish . . . waffles in the coffee shop with real butter . . . parties here and here and here, the National Aviation Clinic opened with a fast one-two to the bread basket, leaving us gasping.

Under the able direction of Steadham Acker, 800 pairs of ears, by official count and gosh only knows how many others, the Clinic gave us words of wisdom from tried and true aviation hands with plenty of "can-do" under their Stetsons. There was a true exchange of constructive ideas for now and the postwar part of aviation.

Roscoe Turner, Mike Doolin, and Casey Jones shook the most hands per capita. Lt. General B. K. Yount and Maj. Gen. C. R. Smith gave us Army talk. Brig. Gen. Tom Hardin who headed up the ATC Hump sat in. Jacquelin Cochran, WASP director, said women were wealthy, wonderful, and smart,—should be catered to more, and then said: "I'm not trying to be a feminist." Ain't that just like a lady?

Some of the builders of planes were there—Bill Piper, natchally; J. Carlton Ward, Kent Bradford, and Lee Smith, Fairchild; Roger Wolfe Kahn, and F. T. Kurt, Grumman; John E. Canaday and Prentiss Cleaves, Lockheed; Eddie Jackson and "Bob" Cantwell, Globe;

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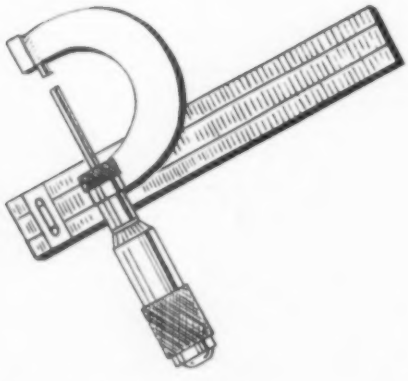

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Robert Davidson, and T. H. Noonan, Aeronca; C. W. Beaufort, Beech; Don Flower, Cessna; H. C. and J. C. Funk, Funk Aircraft; Bill Taylor, Culver; L. H. P. Klotz and R. H. Washburn, Luscombe. Consensus was: "No crystal ball airplane, but better than before."

Parties worthy of BIG mention were Mr. and Mrs. T. E. Braniff's; the officers' club at Tinker Field; the Beacon Club; the Country Club; and a steak dinner which was inspired by Lou Gross, National Aviation Corporation, in the Empire Room at the Black. Luscombe's was par-plus.

John E. Burke, Oke City; "Ray" Ellis, Fayetteville; W. C. Garthoeffner, Oke City; Edgar Ellis, Claremore; Mr. and Mrs. R. J. Cardwell, Bryan; L. D. Catlin, Oke City; C. H. Green, Bonham; C. R. Jones, New Orleans; and L. H. King of Chickasha, all had their ears tuned to the Airport Management speeches, especially; so did Charlie Short, Tulsa. Dudley M. Steele led the speakin'.

James C. Welsch, Consolidated, San Diego, and Les Bowman, Ft. Worth, had chow and a pow-wow. O. M. "Red" Mosier congratulated George Haddaway on his big drum, (given to George as Chief Tom-Tom beater). . . . Joseph Mitchener, Orangeburg, and Fay Thomas, Detroit, remembered the Cleveland Air Races together. . . R. T. Goodwin, Shell Oil Company, won second prize at the chow line (the writer won first by stealing Jim Wheeler's lunch). . . . Julian Freeman flew to Dallas and back one AM. . . . Dick Bromberger, Sensenich, and Weldon Williams, Air Associates, looked wise. . . . R. B. Kenty, Air Associates, heard a cute joke, at least he was laughing considerable, so was Fred Bartholomew, Supply Division, Inc.

Wm. Breedlove, Lubbock, was on the program; Charles Runyon, Pratt & Whitney; Ken J. Boedecker, Wright Aeronautical; D. H. Hollowell, Continental; Howard Olsen, Ranger Aircraft, and Robert Miller, Menasco, were the "engine men" . . . Frank Hulse, Southern Airways, Birmingham — always busy. . . . L. A. Vilas and Colonel Earle Johnson talked the success of CAP. . . . Vilas is back at Pyle-National in Chicago. . . . L. L. Schroeder, St. Paul, and Sheldon B. Steers, Mich., asked questions on the floor and gave answers to the eager listeners on the subject of state legislation. . . . Frank Say met a million friends. . . . K. E. Van Scoy, Butler Brothers, answered O. A. Morard's (Aircraft Steel) question on "when are we going to get hangars" with "you tell me."

J. A. Wooten, American Airlines, tossed fresh spinach at the press and promised to "leave the garbage where it's grown," if food is shipped via air in pretty cellophane bags, without sand and grit. . . . John Paul Jones, Des Moines, said CAA rules must be relaxed,

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parking meters would be unnecessary if drivers had as many restrictions to overcome as pilots. Bill Mara spoke of regulation as aviation's cross. . . . Charles Rhyne won the championship as a Badger fighter; don't ask us why. . . . John Wilson said 95 per cent of the aviation industry is private flying, yet 60 per cent of the public's money is spent on airline airports.

It was the best conference yet . . . more people, more work, and lots of hangar flying . . . more things to see, like the hot shot freight that left Tinker Field and the amount of "polock pop" to be found in a dry state . . . simply amazin' . . . put it on your 1945 calendar—NOW!

Dallas . . . Everybody tripped up to the Indian Territory to check on items cookin' for the aviation gang. Not mentioned in Oke City above were: Major Bill Long, Dallas Aviation School; Hart Bowman, city director of Aviation; Melvin D. Miller, VP, American Airlines; Jack Story, Guiberson; Buck Rowe, Gulf Oil; John E. Williams, Melrose Hotel; Bill Campbell, Weatherby-Campbell; Ed Keller, Aviation department, Magnolia; Jimmy McGill, Don McCann, Air Associates; R. L. Bowman and Mary Royce, CAP; Bill Rychly, Southwest Airmotive; Sandal Dailey and Polly Sherwood, the press; George R. Clay, Texas Pre-Fab; B. J. Anthis, Goodyear, and others. SOUTHERN FLIGHT was there in a large way, George Haddaway, publisher and editor; Tom Ashley, managing editor; Lucien Zacharoff, international aviation writer; E. H. Pickering, air transport; Milt Baldwin, airports, and Tony Hagmann, thisa and thata . . . That's what we call coverage.

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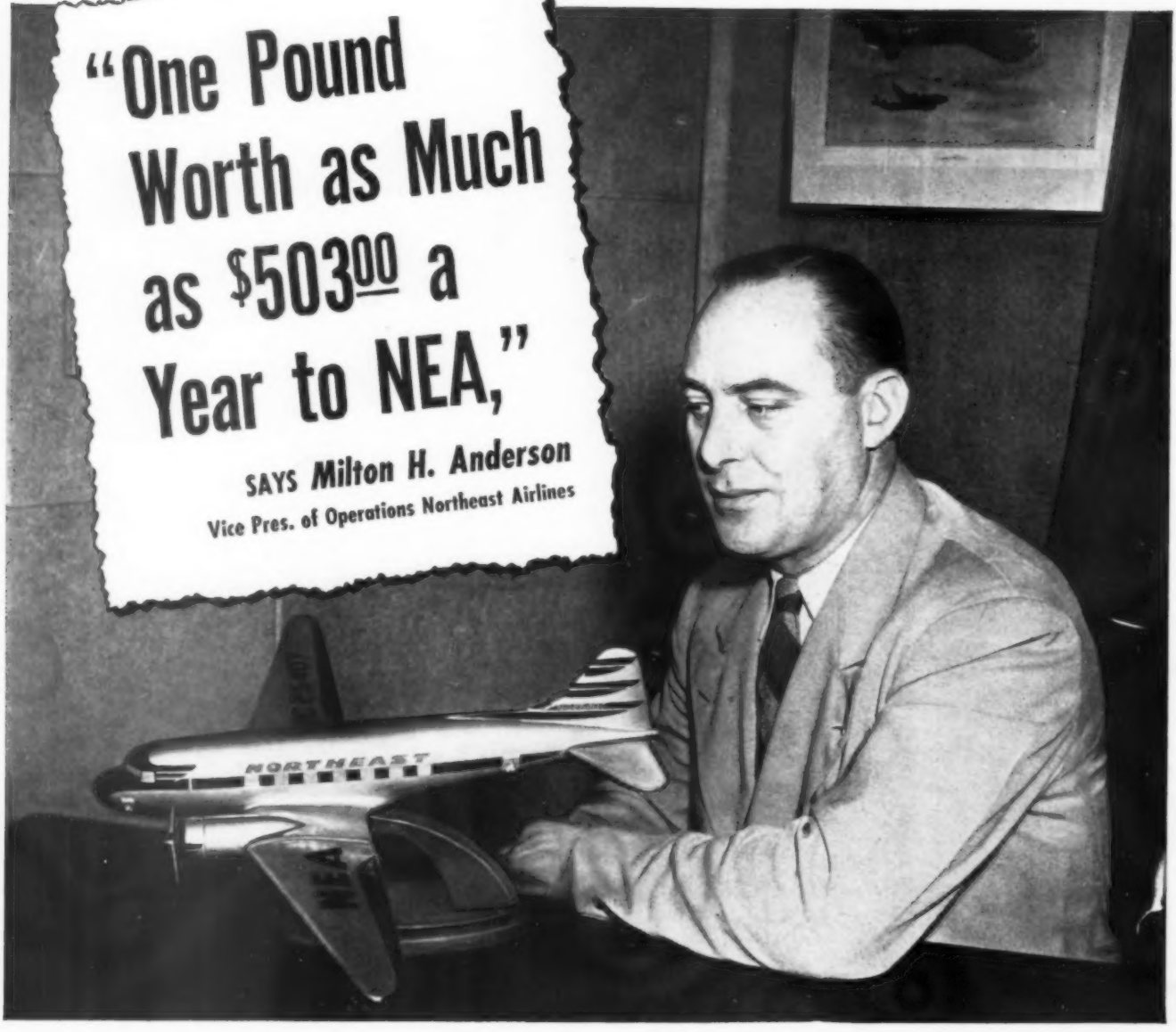

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